RELIAS MEDIA

Internal Medicine

Evidence-based summaries of the latest research in internal medicine [ALERT]

Vol. 40, Issue 23, December 15, 2018
ReliasMedia.com

ABSTRACT & COMMENTARY

Effect of Diet on Hippocampal Volume in a Population at Risk for Alzheimer's Disease

By Lisa Mosconi, PhD

Associate Director, Alzheimer's Prevention Clinic/Department of Neurology, Weill Cornell Medical College

Dr. Mosconi reports no financial relationships relevant to this field of study.

SYNOPSIS: MRI of the brain in community-dwelling people (average age, 60 years) revealed that a long-term, high-quality diet was associated with larger hippocampal volumes after an average interval of 11 years.

SOURCE: Akbaraly T, Sexton C, Zsoldos E, et al. Association of long-term diet quality with hippocampal volume: Longitudinal cohort study. *Am J Med* 2018; Jul 26. doi: 10.1016/j.amjmed.2018.07.001. [Epub ahead of print].

Results from many recent studies have supported the beneficial effect of diet and nutrition on the development of cognitive decline and Alzheimer's disease. Researchers have found that diet not only therapeutically affects cognitive function, but also improves mood, cardiovascular risk, weight loss, and insulin resistance. Although researchers have examined how diet affects many cognitive outcomes, such as memory scores and progression to a diagnosis of mild cognitive impairment or Alzheimer's disease, few have investigated how diet affects brain biomarkers of Alzheimer's disease, especially among middle-aged, cognitively intact individuals. This information is critical when evaluating diet to prevent brain aging and dementia.

Akbaraly et al examined nutritional quality as a predictor of hippocampal volume, a well-established marker of Alzheimer's disease risk, in a prospective cohort of community-dwelling participants from the Whitehall II study, which was designed to investigate long-term health outcomes, particularly cardiovascular disease prevalence and mortality rates, among 10,308 British civil servants recruited between 1985 and 1988.[1] Participants were 35-55 years of age at the beginning of the study. Two-thirds were men and one-third women.

Akbaraly et al focused on a subset of 459 participants who received serial dietary exams and an MRI of the brain an average of 11 years after the study began. Investigators asked participants to use food frequency

Financial Disclosure: *Internal Medicine Alert's* Physician Editor Stephen Brunton, MD, is a retained consultant for Abbott Diabetes, GlaxoSmithKline, AstraZeneca, Boehringer Ingelheim, Salix, Allergan, Janssen, Lilly, Novo Nordisk, and Sanofi; he serves on the speakers bureau of Salix, Allergan, Janssen, Lilly, Sanofi, Novo Nordisk, AstraZeneca, and Boehringer Ingelheim. Peer Reviewer Gerald Roberts, MD; Editor Jonathan Springston; Executive Editor Leslie Coplin; and Editorial Group Manager Terrey L. Hatcher report no financial relationships relevant to this field of study.

Internal Medicine
Evidence-based summaries of the latest research in internal medicine [ALERT]
Internal Medicine Alert (ISSN 0195-315X) is published semimonthly by Relias Learning, 111 Corning Road, Suite 250, Cary, NC 27518-9238. Periodicals postage paid at Cary, NC, and additional mailing offices. POSTMASTER: Send address changes to *Internal Medicine Alert*, Relias Learning, 111 Corning Road, Suite 250, Cary, NC 27518-9238.

GST Registration Number: R128870672.

SUBSCRIBER INFORMATION
(800) 688-2421
customerservice@reliasmedia.com
ReliasMedia.com

Subscription Prices
United States:
Print: 1 year with free *AMA PRA Category 1 Credits™*: $349
Add $19.99 for shipping & handling.

Online only: 1 year (Single user) with *free AMA PRA Category 1 Credits™*: $299

Back issues: $21. Missing issues will be fulfilled by customer service free of charge when contacted within one month of the missing issue's date.

Canada: Add 7% GST and $30 shipping.
Elsewhere: Add $30 shipping.

ACCREDITATION
Relias LLC is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

Relias LLC designates this enduring material for a maximum of 2 *AMA PRA Category 1 Credit(s)™*. Physicians should claim only credit commensurate with the extent of their participation in the activity.

This Enduring Material activity, *Internal Medicine Alert*, has been reviewed and is acceptable for credit by the American Academy of Family Physicians. Term of approval begins 1/15/2018. Term of approval is for one year from this date. Physicians should claim only the credit commensurate with the extent of their participation in the activity. Approved for 2 AAFP Prescribed credits.

The American Osteopathic Association has approved this continuing education activity for up to 2 AOA Category 2-B credits.

Successful completion of this CME activity, which includes participation in the evaluation component, enables the participant to earn up to 2 MOC Medical Knowledge points in the American Board of Internal Medicine's (ABIM) Maintenance of Certification (MOC) program. Participants will earn MOC points equivalent to the amount of CME credits claimed for the activity. It is the CME activity provider's responsibility to submit participant completion information to ACCME for the purpose of granting ABIM MOC credit.

This CME activity is intended for the internist/family physician. It is in effect for 36 months from the date of the publication.

questionnaires to track their food patterns over the previous 11 years, and conducted examinations approximately every five years. MRI scans were performed once, from 2015-2016. At the time, participants were an average of 60 years of age and 19% were female.

The food frequency questionnaires measured intake of 11 components (foods and nutrients), including six components for which high intakes are considered ideal (e.g., vegetables, fruit, whole grains, nuts and legumes, long-chain omega-3 fats, and total polyunsaturated fatty acids) and five components for which avoidance or low intake is considered ideal (e.g., sugar, sweetened drinks and fruit juice, red and processed meat, trans-fat, and sodium). Based on the intake of these foods and nutrients, researchers calculated Alternative Healthy Eating Index 2010 (AHEI) scores for each participant at each visit.[2] A higher score was associated with a higher-quality nutritional diet. Based on AHEI scores, participants were divided into those who maintained a healthy diet, those who maintained a poor-quality diet, those who improved the quality of their diets, and those whose diets degenerated over time.

After adjusting for age, sex, and total calorie intake, higher AHEI scores were significantly associated with larger hippocampal volumes. Each 8.7-point (one standard deviation) increment in AHEI scores was associated with an increase in hippocampal volume by up to 92.5 cc. This effect was independent of several possible confounding factors, such as occupational grade, physical activity, smoking habits, presence of cardiometabolic disorders, cognitive impairment, and depressive symptoms. Additionally, participants who maintained a healthy diet or improved their diet throughout the course of the study showed larger hippocampal volumes compared to those who ate a poor-quality diet.

■ COMMENTARY

These findings are consistent with previous work showing that short-term diet quality is associated with preserved brain biomarkers of Alzheimer's disease in middle-aged and older adults.[3,4] To further support these associations, the authors of two randomized, controlled trials found additional data to support the importance of nutrition for preventing Alzheimer's disease. In the Finnish Geriatric Intervention Study to Prevent Cognitive Impairment and Disability study, researchers found that a lifestyle intervention including nutrition, exercise, and cognitive training reduced the risk of cognitive decline.[5] In the second trial, researchers found that following a Mediterranean-style diet enriched with extra virgin olive oil or a handful of nuts each day improved memory, attention, and executive function compared to a low-fat diet.[6] Although additional randomized, controlled trials are needed, recommending targeted dietary interventions in midlife is evidence-based and safe for reducing the risk of cognitive decline and Alzheimer's dementia. ■

REFERENCES

1. Marmot M, Brunner E. Cohort profile: The Whitehall II study. *Int J Epidemiol* 2005;34: 251-256.
2. Chiuve SE, Fung TT, Rimm EB, et al. Alternative dietary indices both strongly predict risk of chronic disease. *J Nutrition* 2012;142:1009-1018.
3. Berti V, Walters M, Sterling J, et al. Mediterranean diet and 3-year Alzheimer brain biomarker changes in middle-aged adults. *Neurology* 2018;90:e1789-e1798.
4. Gu Y, Brickman AM, Stern Y, et al. Mediterranean diet and brain structure in a multiethnic elderly cohort. *Neurology* 2015;85:1744-1751.
5. Kivipelto M, Mangialasche F, Ngandu T. Lifestyle interventions to prevent cognitive impairment, dementia and Alzheimer disease. *Nat Rev Neurol* 2018; Oct 5. doi: 10.1038/s41582-018-0070-3. [Epub ahead of print].
6. Valls-Pedret C, Sala-Vila A, Serra-Mir M, et al. Mediterranean diet and age-related cognitive decline: A randomized clinical trial. *JAMA Intern Med* 2015;175:1094-1103.

ABSTRACT & COMMENTARY

Risk of Infective Endocarditis Revisited

By Michael H. Crawford, MD

Professor of Medicine, Chief of Clinical Cardiology, University of California, San Francisco

Dr. Crawford reports no financial relationships relevant to this field of study.

SYNOPSIS: In a comparison of patients with infective endocarditis (IE) and either bicuspid aortic valve (BAV) or mitral valve prolapse (MVP) vs. other IE patients at high or low-to-moderate risk of IE, BAV and MVP patients were more likely to exhibit viridans group streptococci infections of suspected odontogenic origin and cardiac complications at similar rates to high-risk patients.

SOURCES: Zegri-Reiriz I, de Alarcón A, Muñoz P, et al. Infective endocarditis in patients with bicuspid aortic valve or mitral valve prolapse. *J Am Coll Cardiol* 2018;71:2731-2740.

Chambers JB. Antibiotic prophylaxis against infective endocarditis: Widening the net? *J Am Coll Cardiol* 2018;71:2741-2743.

There are growing data regarding an increase in infective endocarditis (IE) in those at moderate risk who are excluded from antibiotic prophylaxis (AP) prior to nonsterile procedures. Zegri-Reiriz et al evaluated patients with bicuspid aortic valve (BAV) and mitral valve prolapse (MVP) with IE to learn more about the potential use of AP in patients with these intermediate risk conditions.

Patients with IE from 31 Spanish hospitals were entered into a registry from 2008-2016 (n = 3,524; 316 patients with isolated device-related IE eventually were excluded). After exclusion, 3,208 patients remained, of whom 1,226 were high risk and 1,982 were low-to-moderate risk. Among the 1,982 low-to-moderate risk patients remaining, Zegri-Reiriz et al considered an additional 143 patients from this group separately (n = 54 BAV patients and n = 89 MVP patients). Major adverse IE events were heart failure, embolism, persistent bacteremia, and intracardiac complications. The likely portal of bacteria entry was identified prospectively. The main analysis was a comparison of the clinical features of BAV and MVP IE patients to those at high risk and low-to-intermediate risk of IE. In patients with BAV or MVP, the most common organism detected was viridans group streptococci, which was about three times more common than that observed in the high-risk and remaining low/moderate-risk groups (39% vs. 13%; $P < 0.01$).

An odontological portal of entry also was more common in the BAV/MVP group than in the remaining patients (17% vs. 6%; $P < 0.01$). By contrast, staphylococci were the most frequently detected organisms in the high-risk and the remainder of the low/moderate-risk groups ($P < 0.01$) and was more likely nosocomial in these groups. BAV and MVP patients demonstrated similar rates of intracardiac complications as the high-risk patients, both of which were higher than in the low/moderate-risk patients (50% BAV/MVP and 47% high risk vs. 31% low to moderate risk; $P < 0.01$). The authors concluded that IE patients with BAV or MVP have more viridans group streptococci infections from odontologic sources than other IE patients and a clinical profile similar to high-risk IE patients. These data suggest that these two lesions should be considered high risk for AP consideration.

■ COMMENTARY

As more data accumulate, the controversy over the 2007 AP guidelines to prevent IE intensifies. A recently published study from the United Kingdom showed that during a five-year follow-up, many patients considered at moderate risk for IE developed IE at a similar frequency or higher than those considered at high risk by the guidelines.[1] Those authors concluded that the guidelines should be changed to recommend IE prophylaxis for patients with electrophysiology devices, hypertrophic cardiomyopathy, congenital valve disease, and nonrheumatic valve disease. As this U.K. study was based on administrative data, few clinical details were available. BAV and MVP patients were included in the congenital and nonrheumatic valve disease categories, respectively, but there were no specific details on these common conditions. Thus, the Zegri-Reiriz et al study of BAV and MVP patients is of interest.

The Zegri-Reiriz et al study is the largest series to date regarding IE in BAV and MVP patients. Participants were relatively young, male, and had few comorbidities. However, these participants exhibited cardiovascular complications at rates similar to patients with high-risk conditions (BAV, 50%; MVP, 47%; high risk, 45%) and significantly higher than low/moderate-risk IE patients. Also, the MVP/BAV patients had high rates of viridans group streptococci IE and of suspected odontologic origin. In addition, the number of BAV patients sent to surgery was high (68%). MVP patients were sent to surgery at rates similar to the low/moderate-risk group (39%), but 66% left the hospital with severe mitral regurgitation.

Given the equivalent or worse outcomes of IE in BAV and MVP patients, the authors believed that this indirectly supports including these patients in the AP recommendations.

The major strengths of this study were the large number of patients and complete microbiologic data. However, there were weaknesses, including the lack of AP data. Since Zegri-Reiriz et al recruited patients after the 2007 guidelines were released, presumably the high-risk patients underwent AP and the low/moderate-risk patients did not. Also, odontologic origin was not divided into subcategories, such as dental procedures and poor dentition. Additionally, this was a study of hospitalized patients with IE. We do not know the denominator; thus, IE incidence or prevalence cannot be determined. However, we know from other studies that IE in BAV patients is 30 times higher than the general population, and MVP is the most common underlying condition for IE in developed countries. If the AP guidelines are ever revised, perhaps patients with BAV and MVP (especially those with moderate or greater valvular regurgitation) should be included in the high-risk group and considered candidates for AP. ■

REFERENCE

1. Thornhill MH, Jones S, Prendergast B, et al. Quantifying infective endocarditis risk in patients with predisposing cardiac conditions. *Eur Heart J* 2018;39:586-595.

ABSTRACT & COMMENTARY

Costs and Consequences of Chronic Pain Among U.S. Adults

By Louise M. Klebanoff, MD

Assistant Professor of Clinical Neurology, Weill Cornell Medical College

Dr. Klebanoff reports no financial relationships relevant to this field of study.

SYNOPSIS: Chronic and disabling pain is a common and serious cause of morbidity among U.S. adults.

SOURCE: Dahlhamer J, Lucas J, Zelaya C, et al. Prevalence of chronic pain and high-impact pain among adults – United States, 2016. *MMWR Morb Mortal Wkly Rep* 2018;67:1001-1006.

Chronic pain is one of the most common reasons adults seek medical care. Chronic pain is associated with multiple physical and psychological conditions that contribute to restricted mobility and daily activities, dependence on opioids, anxiety and depression, and poor perceived health or reduced quality of life. In turn, this leads to high healthcare costs and lost productivity. One of the nation's science-based health objectives is to decrease the prevalence of adults experiencing high-impact chronic pain.

To estimate the prevalence of chronic pain in the United States, the CDC analyzed data from the 2016 National Health Interview Survey. Chronic pain was defined as pain on most days or every day in the past six months. High-impact chronic pain was defined as chronic pain that limited life or work activities on most days or every day during the last six months. Based on this survey, about 50 million U.S. adults reported chronic pain, with 19.6 million experiencing high-impact chronic pain. Higher prevalence of chronic pain and chronic high-impact pain was seen in women, older adults, adults who previously but not currently were employed, adults living in poverty, those with public health insurance, and those in rural regions. The age-adjusted prevalence of chronic pain was significantly lower among adults with a college degree. There were no significant racial or ethnic differences in those with chronic high-impact pain, although non-Hispanic white adults reported more chronic pain than other ethnic/racial subgroups.

Annually, chronic pain accounts for an estimated $560 billion in direct medical costs, lost productivity, and disability programs. Identifying populations at risk is the first step for developing targeted interventions for pain management.

■ COMMENTARY

Chronic pain is a common, multidimensional medical condition that contributes to high healthcare costs, lost productivity, and poor quality of life, and fuels the current opioid epidemic. High-impact chronic pain refers to pain that is frequent and disabling. The results of this study help quantify the prevalence of high-impact chronic pain and, by identifying specific patient populations at risk, will help inform targeted interventions. ■

BRIEF REPORT

Should Aspirin Be Used for Primary Prevention of Cardiovascular Events?

By Matthew E. Fink, MD

Feil Professor & Chair of Neurology, Associate Dean for Clinical Affairs, NYP/Weill Cornell Medical College

Dr. Fink reports no financial relationships relevant to this field of study.

SOURCES: McNeil JJ, Woods RL, Nelson MR, et al; for the ASPREE Investigator Group. Effect of aspirin on disability-free survival in the healthy elderly. *N Engl J Med* 2018; Sep 16. doi: 10.1056/NEJMoa1800722. [Epub ahead of print].

McNeil JJ, Woods RL, Nelson MR, et al; for the ASPREE Investigator Group. Effect of aspirin on cardiovascular events and bleeding in the healthy elderly. *N Engl J Med* 2018; Sep 16. doi: 10.1056/NEJMoa1805819. [Epub ahead of print].

McNeill JJ, Woods RL, Nelson MR, et al; for the ASPREE Investigator Group. Effect of aspirin on all-cause mortality in the healthy elderly. *N Engl J Med* 2018, Sep 16. doi: 10.1056/NEJMoa1803955. [Epub ahead of print].

In a remarkable series of recently published articles, McNeil and collaborators reported on the effects of aspirin as primary prevention for cardiovascular disease in a cohort of healthy elderly people. These studies are of particular interest to clinicians whose practices are related to stroke prevention, both primary and secondary. Also, patients, families, and referring physicians often ask if it is appropriate to take daily aspirin for stroke prevention.

In these three studies, almost 20,000 people (median age, 74 years) were enrolled and assigned randomly to receive aspirin or placebo daily for primary prevention. Fifty-six percent of participants were women, 8.7% were nonwhite, and 11% reported previous regular aspirin use. Investigators ended the trial at a median of 4.7 years of follow-up when it was determined that daily aspirin use showed no benefit regarding the primary endpoints. Primary and secondary endpoints included the rate of composite death, dementia, physical disability, and cardiovascular events. The cardiovascular events included fatal coronary heart disease, nonfatal myocardial infarction, fatal or nonfatal stroke, and hospitalization for heart failure. In addition, investigators examined the effects of daily aspirin on all-cause mortality in this same group of healthy older adults. In light of the generally accepted view that daily aspirin has many health benefits, the results of this study revealed that aspirin use in healthy elderly people did not prolong disability-free survival over a five-year period. However, such use did result in a higher rate of major hemorrhages compared to placebo. In addition, the use of low-dose aspirin as primary prevention in elderly adults to prevent cardiovascular events, including stroke, did not result in a significantly lower risk of cardiovascular disease. However, such use did result in an increased rate of major hemorrhages.

When evaluating all-cause mortality, healthy older adults who received daily aspirin demonstrated a higher rate of all-cause mortality, which investigators attributed primarily to cancer-related deaths. The conclusion from this series of groundbreaking studies is that primary prevention of cardiovascular disease and death by using daily low-dose aspirin is not recommended and should be reserved for those instances in which secondary prevention has been demonstrated to be effective in randomized, clinical trials.

Clinicians should take note of these studies, which significantly affect patients. ■

PHARMACOLOGY UPDATE

Sufentanil Sublingual Tablets (Dsuvia) CII

By William Elliott, MD, FACP, and James Chan, PharmD, PhD

Dr. Elliott is Assistant Clinical Professor of Medicine, University of California, San Francisco.
Dr. Chan is Associate Clinical Professor, School of Pharmacy, University of California, San Francisco.

Drs. Elliott and Chan report no financial relationships relevant to this field of study.

The FDA has approved a highly potent opioid analgesic for acute severe pain reserved for use in certain medically supervised healthcare settings. This sublingual formulation of sufentanil is 10 times more potent than fentanyl and 100 times more potent than morphine. The tablets were developed in collaboration with the Department of Defense and will be marketed as Dsuvia through a restricted Risk Evaluation and Mitigation Strategy program.

INDICATIONS

Sufentanil sublingual tablets (sufentanil-SLT) are for adults with acute pain that is severe enough to require an opioid analgesic for which different treatments have proven insufficient.[1] Providers are expected to administer the drug in a certified, medically supervised healthcare setting.

DOSAGE

The recommended dose is 30 mcg given sublingually via a single-dose applicator, as needed, with a minimum of one hour between doses. The dose is not to exceed 12 tablets in 24 hours and for a duration of no more than for 72 hours.[1] Sufentanil-SLT is available as a 30 mcg tablet in a disposable, tamper-evident, single-dose applicator.

POTENTIAL ADVANTAGES

Sufentanil-SLT provides an alternative in a setting in which the patient cannot swallow oral medication and access to IV administration of an analgesic is not possible or may be delayed (e.g., battlefield).

POTENTIAL DISADVANTAGES

Because of its potency, sufentanil-SLT likely will increase the risk of serious, life-threatening, or fatal respiratory depression as well as the risk for diversion and abuse. Since the drug is metabolized by CYP3A4, concomitant use with CYP3A4 inhibitors or discontinuation of CYP3A4 inducers can result in fatal overdose.[1]

Sufentanil-SLT has a smaller safety margin with concurrent use with benzodiazepines or other central nervous system depressants and accidental exposure. It is contraindicated in patients with acute or severe bronchial asthma and known or suspected gastrointestinal obstruction. Patients with COPD, patients who are elderly, cachectic, or debilitated, and patients with increased intracranial pressure require close monitoring.

COMMENTS

Sufentanil-SLT onsets rapidly, with a duration of analgesia of about three hours.[2] The efficacy and safety were evaluated in one randomized, placebo-controlled trial that included 161 subjects with moderate-to-severe acute postoperative pain (≥ 4 on an 11-point numeric rating scale) after abdominal surgery.[1,2] These procedures included abdominoplasty, open inguinal hernioplasty, or laparoscopic abdominal surgery. Subjects received sufentanil-SLT 30 mcg (n = 107) or placebo (n = 54) on an as-needed basis, with a minimum of 60 minutes between doses. IV morphine was available as rescue medication. The primary efficacy endpoint was the time-weighted summed pain intensity difference over 12 hours (SPID12).

Sufentanil-SLT showed statistically significant SPID12 over placebo. The onset of analgesia occurred within 15-30 minutes, with median time to meaningful pain relief of 54 minutes for sufentanil-SLT vs. 84 minutes for placebo. Approximately 22% of subjects assigned to sufentanil-SLT took rescue analgesic vs. 65% with placebo. The safety of sufentanil-SLT was assessed in 646 subjects. Half the subjects in the safety assessment were on the 15 mcg formulation approved in the Europe Union.[2] There were no data on subjects ≥ 75 years of age on the higher dose. The most frequently reported (> 10%) adverse reactions were nausea (29%) and headache (12%). Less frequent adverse reactions included vomiting (5.6%), dizziness (5.6%), and hypotension (4.7%).

CLINICAL IMPLICATIONS

Sufentanil-SLT is a highly potent opioid analgesic that is the sublingual form of sufentanil, a drug that has been available since 1984. Currently, there are no data comparing sufentanil-SLT to other analgesics; thus, relative potency cannot be determined.

Critics have questioned the need for such a potent opioid, given the current addiction crisis. The drug received a favorable vote in a session of the FDA's

Anesthetic and Analgesic Drug Products Advisory Committee (AADPAC). However, AADPAC Chairperson Raeford E. Brown, Jr., MD, who opposes the drug, was unable to attend that meeting.[3] Brown and others cited absence of full participation of the FDA's Drug Safety and Risk Management Advisory Committee during the review and substantial risk of respiratory depression, diversion, abuse, and death (including among anesthesiologists).

However, FDA Commissioner Scott Gottlieb, MD, defended the approval, citing it fills a targeted medical need and there are adequate limitations on its use.[4] ■

REFERENCES

1. Dsuvia Prescribing Information. AcelRx Pharmaceuticals, Inc., November 2018. Available at: https://bit.ly/2P0EgBO. Accessed Nov. 21, 2018.
2. FDA Briefing Document. Anesthetic and Analgesic Drug Products Advisory Committee, Oct. 12, 2018. Available at: https://bit.ly/2zny5T6. Accessed Nov. 21, 2018.
3. Public Citizen. Letter to the FDA, Oct. 18, 2018. Available at: https://bit.ly/2Qh1Yhw. Accessed Nov. 21, 2018.
4. U.S. Food & Drug Administration. Statement from FDA Commissioner Scott Gottlieb, M.D., on agency's approval of Dsuvia and the FDA's future consideration of new opioids, Nov. 2, 2018. Available at: https://bit.ly/2F4uZJ2. Accessed Nov. 21, 2018.

CME INSTRUCTIONS

To earn credit for this activity, please follow these instructions:
1. Read and study the activity, using the provided references for further research.
2. Log on to **ReliasMedia.com** and click on My Account. First-time users must register on the site using the eight-digit subscriber number printed on their mailing label, invoice, or renewal notice.
3. Pass the online test with a score of 100%; you will be allowed to answer the questions as many times as needed to achieve a score of 100%.
4. After completing the test, a credit letter will be emailed to you instantly.
5. Twice yearly after the test, your browser will be directed to an activity evaluation form, which must be completed to receive your credit letter.

CME QUESTIONS

1. Which of the following food categories is *not* part of a high-quality diet?
a. Fresh fruits and vegetables
b. Nuts and legumes
c. Sweet fruit juices
d. Whole grains

2. Patients with infective endocarditis with bicuspid aortic valve or mitral valve prolapse compared to those with high-risk underlying conditions exhibit:
a. fewer viridans streptococcal group infections.
b. more staphylococcal infections.
c. similar rates of cardiac complications.
d. less suspicion for an odontologic origin.

3. Which of the following is not a characteristic of patients with chronic high-impact pain?
a. Female
b. Older
c. Higher educational level
d. Not currently employed

4. Daily low-dose aspirin for the primary prevention of cardiovascular disease is no longer recommended.
a. True
b. False

CME OBJECTIVES

Upon completion of this educational activity, participants should be able to:

- describe new findings in the differential diagnosis and treatment of various diseases;
- describe the advantages, disadvantages, and controversies surrounding the latest advances in the diagnosis and treatment of disease;
- identify cost-effective treatment regimens;
- explain the advantages and disadvantages of new disease screening procedures.

Internal Medicine [ALERT]

ECG Review

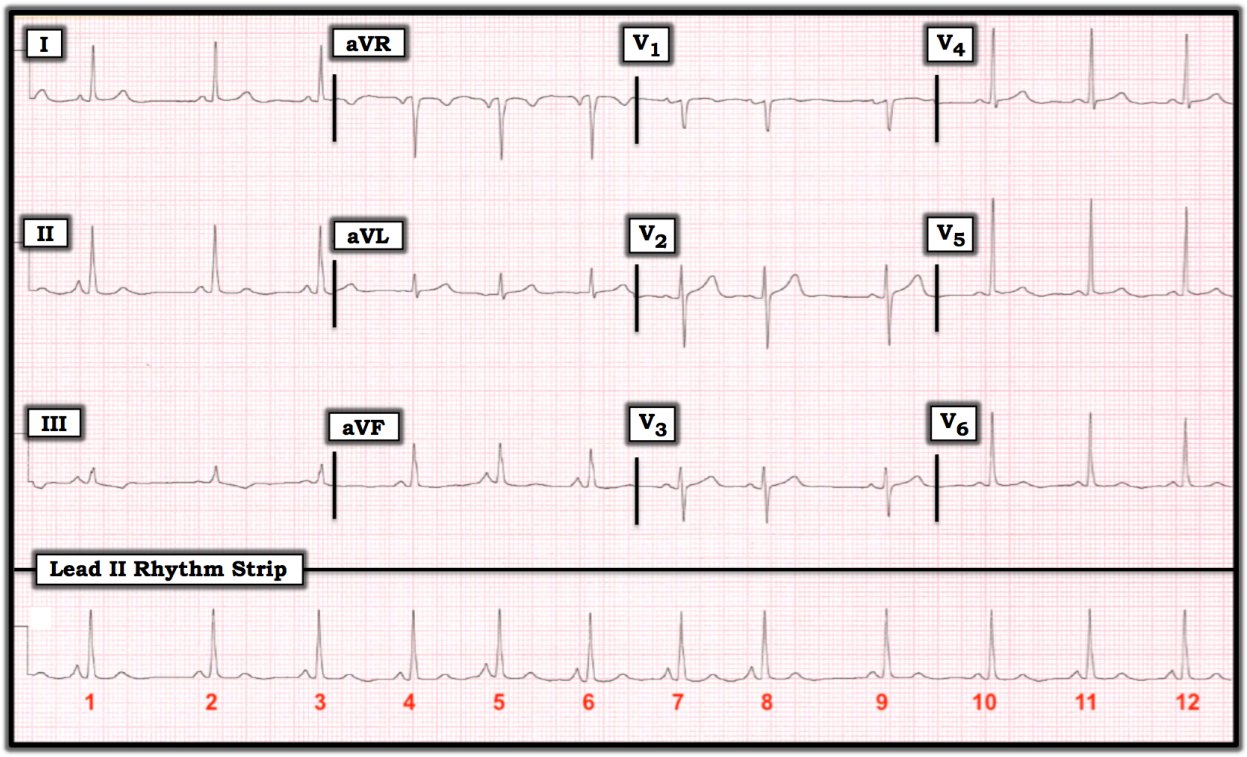
By Ken Grauer, MD

Professor Emeritus in Family Medicine, College of Medicine, University of Florida

Dr. Grauer reports no financial relationships relevant to this field of study.

What Does the Sinus P Look Like?

The ECG in the figure below was obtained from a woman in her 50s who complained of intermittent chest discomfort in recent weeks. She was hemodynamically stable at the time this tracing was obtained. How might one interpret this ECG?



The rhythm is irregular. The QRS complex is narrow. P waves are present, albeit P wave morphology is changing. There are three different shapes of P waves in the long lead II rhythm strip. That is, P waves are tall and pointed in front of beats 1, 5, 6, 7, and 8; P waves are round in front of beats 2, 9, and 10; P waves are pointed, but not quite as tall, in front of beats 3, 4, 11, and 12.

Each P wave in this long lead II is conducting. For each of these three different P wave shapes, all beats of that shape manifest the same PR interval. The principal differential diagnoses for an irregular rhythm with different-shape P waves that are conducting are: sinus rhythm with multiple premature atrial contractions (PACs), multifocal atrial tachycardia (MAT), or wandering pacemaker.

This is not sinus rhythm with PACs because there is no predominant underlying sinus rhythm. Although R-R intervals are shorter in some places, there are no beats that are especially early (i.e., there are no PACs). This is not MAT because P wave morphology and the PR interval do not change from one beat to the next. Instead, there is gradual change in the site of the supraventricular pacemaker over the course of several beats. This strongly suggests the presence of a wandering atrial pacemaker. Other than the rhythm, there are minimal nonspecific ST-T wave abnormalities in several leads that do not appear to be acute.

Wandering atrial pacemaker is virtually always a benign rhythm. Technically, there should be at least three different atrial sites to distinguish a wandering atrial pacemaker from a simple atrial escape rhythm. The clinical reality is that most of the time the period of monitoring available for scrutiny simply will not be long enough to appreciate gradual shift in the site of the atrial pacemaker to at least three different sites. As a result, true wandering pacemaker is not a common diagnosis.

This case is unique in clinical experience for allowing definitive diagnosis of this rhythm in no more than a short long lead II rhythm strip. Most of the time, a much longer period of monitoring is needed.

For more information about and further discussion on this case, please visit: https://bit.ly/2DjFWDW.