have simply been a limitation of their database. Second, certain known risk factors for hernias and aneurysms (eg, smoking and family history)^{6,7} were not included but are relevant given the multifactorial nature of both diseases. Similarly, because aneurysm prevalence differs by both race and geography, these findings might not be generalizable for groups with a higher disease burden.

This study is unique because it describes a large population and included all abdominal hernias and aortic aneurysms. It provides real-world clinical data suggesting an association between hernias and aneurysms. However, the authors correctly conclude that this study is not sufficient to deduce either direct correlation or causation, nor does it provide a strong enough basis to change current screening guidelines. A similar study with diverse cohorts of age, gender, and race over a larger time period would be of potential interest.

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Commentary: Everything matters

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During 2005, the US Preventive Services Task Force (USPSTF) provided a recommendation that 1-time ultrasound abdominal aortic aneurysm (AAA) screening in men aged >65 years with a family history of AAA or a history of smoking (>100 cigarettes in lifetime) was associated with reduced aortic rupture and related mortality.¹

The Centers for Medicare and Medicaid Services (CMS) subsequently approved payment for this screening with an appropriate referral as part of an Initial Preventive Physical Examination. During 2014, the USPSTF performed an updated analysis regarding screening for AAA that further

US mortality rate for total, heart disease, cancer, aneurysms, and dissection events per 100,000 population.

CENTRAL MESSAGE

Hernias may be associated with AAA but current guidelines for ultrasound screening do not include it as a risk factor. Further work is required to improve understanding and decrease the death rate from aneurysms and dissection.

corroborated the continued benefit of ultrasound screening, especially in late follow-up. This led CMS to lift the referral requirement on payment coverage of AAA ultrasound screening, such that any clinical provider could request the screening ultrasound.²

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FIGURE 1. US mortality rate from 1999 to 2017, including total, heart disease, cancer, and aneurysms dissection reported as events/100,000 population. Included are the years that the Food and Drug Administration approved endovascular aneurysm repair (EVAR), thoracic endovascular aortic repair (TEVAR) for aneurysm, ultrasound screening for abdominal aortic aneurysm (AAA), and TEVAR for all aortic disorders.

In the 2014 report, which led to the recommendations by the USPSTF, Guirguis-Blake and colleagues³ reviewed more than 2000 abstracts and 200 articles, focusing on 4 randomized controlled trials (RCTs) of more than 137,000 participants. From that meta-analysis, the current CMS recommendations were derived. In the most recent USPSTF update (2019), other suspected risk factors, such as hypertension, hyperlipidemia, family history (primary relative), and arteriosclerosis were not found to be associated with AAA mortality but could be considered in men aged >65 years who never smoked (class C recommendation).⁴ In no report by the USPSTF was presence of abdominal hernia mentioned in association with AAA.

The association between abdominal wall hernias and AAA has been known for some time but concrete evidence linking the conditions has not been well established.⁵ In fact, conflicting data from a large Danish population-based study suggested no correlation between inguinal hernia and AAA.⁶ A limiting factor has been related to study design of prior reports, which examined cohorts of AAA patients and the presence of inguinal hernias as opposed to examining patients with hernias to survey for AAAs. Not knowing the true denominator may have led to bias and reducing evidence for an association.

Hung and colleagues⁷ analyzed data from 1 million randomly selected patients harvested from Taiwan's National Health Insurance Program to determine an association between abdominal wall hernias and AAA. Patients with abdominal wall hernias were included as the hernia group. Appropriately, patients with prior history of thoracic aortic aneurysm or AAA, family history of AAA, prior history of incisional hernia, or heritable disorders (eg, Marfan syndrome, Takayasu arteritis, bicuspid aortic valve, Ehlers-Danlos syndrome, and Turner syndrome) were excluded. The control group was selected and propensity score matching was performed controlling for age, sex, and comorbidities, including hypertension and chronic obstructive pulmonary disease.

Unfortunately, smoking status was not known and chronic obstructive pulmonary disease was used as a surrogate.

About 17,000 hernia patients were compared with more than 50,000 matched controls with follow up of 14 years. The authors identified that AAA occurred more frequently in the hernia group than in the control group—both in unadjusted (6.4 vs 1.2 per 10,000 person-years) and adjusted (6.4 vs 4.8 per 10,000 person-years) analysis. This relationship was more pronounced in the group aged >65 years (15.6 vs 10.4 per 10,000 person-years). To exclude diagnostic testing frequency as a variable, the authors examined the

FIGURE 2. US mortality rate from 1999 to 2017 from aneurysms and dissection by age groups reported as events/100,000 population. Included are the years that the Food and Drug Administration approved endovascular aneurysm repair (EVAR), thoracic endovascular aortic repair (TEVAR) for aneurysm, ultrasound screening for abdominal aortic aneurysm (AAA), and TEVAR for all aortic disorders.

rates of ultrasound, computed tomography, and magnetic resonance imaging and found no difference in surveillance between groups. The authors provide compelling evidence suggesting the association between abdominal wall hernias and AAAs. However, the question is, Are these enough to alter the current guidelines regarding screening? The answer, unfortunately, is no.

The current recommendations for AAA screening are appropriately conservative. They have been validated by 4 large RCTs and updated 3 times over the past 15 years. The guidelines also allow flexibility and clinical judgment by stating, “In determining whether this service is appropriate in individual cases, patients and clinicians should consider the balance of benefits and harms on the basis of evidence relevant to the patient’s medical history, family history, other risk factors, and personal values.”⁴ This recommendation was still class C without any adjustment related to CMS coverage. In contrast, the report by Hung and colleagues⁷ was an analysis of administrative claims data—not an RCT—and, therefore, was limited by the inherent bias of its retrospective nature, although completeness of follow-up was a strength. In addition, this report included only Taiwanese patients, leading to questions regarding the applicability to the Western populations.

Despite these limitations, the current report draws attention to the potential association of abdominal wall hernias and AAA. The implications are obvious, as incidence of abdominal wall hernia repair (not including unrepaired hernias) is estimated to be about 1 million/year in the United States.⁸ As such, a marked increase in AAA screening would result if confirmed as a risk factor.

Moving forward, a history of an abdominal wall hernia (ventral or inguinal) should be included as a variable in future prospective studies evaluating screening for aneurysms. Although this is an important question, a larger, more pragmatic question looms: Have the current US screening guidelines for AAA actually had an effect and reduced aortic-related mortality?

Using the National Vital Statistics Reports from 1999 to 2017, we tabulated mortality rates for total, heart disease, cancer, and aneurysms and dissection and provide the results in Figure 1.⁹ Of note, the category of aneurysms and dissection debuted on the list in 1999 as the 14th-leading cause of death. Also notable was the fact that the reduction in mortality rate for aneurysms and dissection was 48% compared with 25% for heart disease, and 9% for cancer during the same period. In Figure 2, mortality rates from aneurysm and dissection categorized by age 65 to 74 years, 75 to

84 years, and >85 years are presented. Within each figure, the years the Food and Drug Administration approved significant medical and surgical advancements in aneurysm treatment is noted. What is not clear is the role of ultrasound screening in the decreasing mortality rate. Figures 1 and 2 demonstrate a significant improvement in mortality rates over the past 2 decades—especially in older population subgroups. We recognize that we cannot attribute these decreases only to the advancements listed in the Figures—there are likely many other factors involved in this decrease—but the observations are intriguing. In the end, we, as a specialty, are making a difference. Although each treatment, including screening, may not appear to have a large effect, everything matters.

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