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Platinum Priority – Editorial

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Toward a Better Understanding of Kidney Stone Disease: Platinum Priorities

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Kidney stones are a common and costly disease, and our epidemiologic understanding is continuing to evolve. In their broadest terms, epidemiologic investigations describe a wide range of scientific efforts that can range from comparing the frequency of stone disease among different populations to identifying nonurologic risk factors for the disease. One of the great values of such epidemiologic investigations is that they can ultimately lead to an interventional study, a scientific inquiry to test whether identified risk factors will predict the disease in question and then whether modification of those risk factors will bring about a decline in the prevalence of the disease. In this way, the health of the larger community can be improved.

The epidemiology of kidney stone disease is a relatively young field, with the vast majority of seminal publications having occurred in the past 2 decades. In 2003, a report from Stamatelou and associates had a pivotal effect on our understanding of the epidemiology of kidney stone disease [1]. In this extensive investigation, the authors analyzed data from the second and third iterations of the National Health and Nutrition Examination Surveys (NHANES), a survey performed in the United States to assess the health and nutritional status of adults and children and to track changes in health status over time. NHANES II was composed of data recorded from 1976 to 1980, and NHANES III was composed of data recorded from 1988 to 1994. By comparing these two time periods, the Stamatelou group found that the lifetime prevalence of kidney stones increased from 3.2% in NHANES II to 5.2% in NHANES III. Among men, the prevalence increased from 4.9% to 6.3%, and among women it increased from 2.8% to 4.1%. This study remains one of the most important epidemiologic investigations of kidney stone disease to date, due not only

to the large-scale nature of the data set but also because no previous studies had reported such profound changes in the prevalence of the disease.

In the present issue of *European Urology*, Scales and associates have built on this important work, undertaking an investigation of the 2007–2010 NHANES dataset to estimate a more recent prevalence of stone disease in the United States [2]. The NHANES kidney stone data void that occurred between 1994 and 2007 is due to the fact that kidney stone disease was not specifically queried in NHANES data collections performed in that time period. In those intervening 13 yr, though, dramatic changes have apparently occurred in the landscape of stone disease. Scales and associates reported that the prevalence of stone disease among men increased from 6.3% in NHANES III to 10.6% in the 2007–2010 data set; among women, the degree of change was similar in magnitude increasing from 4.1% in NHANES III to 7.1% in the 2007–2010 dataset. As with the previous work of Stamatelou and associates, the Scales group was also able to investigate the relationship between kidney stones and demographic factors such as age and race. Among the different races, non-Hispanic white individuals claimed the greatest prevalence, with Hispanic and black non-Hispanic individuals both claiming lower prevalence rates among men and women. Prevalence rates also increased with age among men and women across all racial categories.

What the present work was also able to do in a novel fashion, as a consequence of design changes in the NHANES data collection protocol since the NHANES III instrument, was to relate the prevalence of kidney stones to markers of the metabolic syndrome and socioeconomic status. In recent years, a number of investigators have defined

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associations between the metabolic syndrome, as well as individual components of the metabolic syndrome such as obesity, hypertension, hyperglycemia, and hyperlipidemia, with the risk for kidney stones [3–5]. In the 2007–2010 NHANES analysis, Scales and associates found that kidney stones were associated with both obesity and diabetes, which further supports the previous conclusions drawn by others. Chronic diseases have also been reported to affect individuals of lower socioeconomic status disproportionately, and causative factors have been hypothesized to include dietary and environmental features more commonly encountered among these individuals [6]. Based on the present work of Scales et al, the prevalence of kidney stone disease also appears to be associated with socioeconomic status, and individuals in the lowest cohort of annual household income were significantly more likely to have stone disease than were individuals in the highest cohort of annual household income.

Isaac Newton said, “If I have seen a little further, it is by standing on the shoulders of giants,” and indeed, the present work of Scales and associates builds on the important previous NHANES investigations in much the same way. However, this work, in and of itself, makes an important contribution to our understanding of the modern epidemiology of stone disease. Much as David Goldfarb noted in his editorial that accompanied the paper by Stamatelou et al in 2003, the present study by Scales et al also provides strong evidence that environmental factors, rather than genetic factors, are predominantly responsible for the dramatic rise in the prevalence of stone disease in the United States [7]. Risk factors for stone disease identified in the present study include obesity and diabetes, which are inextricably tied to physical inactivity, as well as excess dietary calorie and fat intake.

The increasing prevalence of kidney stones, as well as its association with nonurologic conditions such as obesity and diabetes, emphasizes that lifestyle changes that protect against chronic disease may have benefits on a broader health scale. It is not a new concept that disease entities can have shared risk factors. It has been known for decades that hyperglycemia can increase the risk for atherosclerotic disease. However, when it comes to kidney stone disease, there is a conceivable disconnect between the urologic literature base and the literature base of physicians and health care providers with more focused interests in the primary care specialties. As a consequence, studies such as the present one that elegantly describe a dramatic rise in the prevalence of stone disease, as well as the association of that disease with chronic nonurologic conditions, may not effectively reach the nonurologic community. Therefore, when we discuss educational efforts in stone prevention,

our audience must not only be the patient but should also be the primary care community. A complete discussion of the benefits of weight loss and the correction of impaired glucose tolerance should obviously include a reduction in cardiovascular morbidity and mortality, but now there is substantial evidence that a reduction in kidney stone risk should also be included as a potential benefit. Given the prevalence of the disorder described here, in which approximately 10% of the population has the disease, a greater emphasis on preventive maneuvers is imperative.

Perhaps the most important point of the work by Scales and associates is its recognition that the incidence of kidney stones in the United States is continuing to increase at a great rate. The cost of care for this disease is enormous, and there is no indication that the coming years will see any improvement in this trend. Although we have seen great advances in the surgical technologies and techniques applied to the treatment of patients with stone disease, there have been no similar innovations in pharmacotherapy for this disorder. As prevalence rates of obesity and metabolic disease, both of which are independently associated with kidney stone risk, continue to rise, the burden of stone disease on society is going to continue to increase. Therefore, there is going to be an ongoing and urgent need to allocate both research support as well as public health interventions toward mitigation of this important disease process.

Conflicts of interest: The author has nothing to disclose.

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