

Kidney Disease: Surprising Patients and Unexpected Consequences

Q Recently, I have seen four or five Asian-American patients with really bad kidney function. All of them were thin but had diabetes, hypertension, and a serum creatinine > 2 mg/dL. The kidney disease was a shock to them (and me). Am I missing something here?

Diabetes and hypertension are the most common causes of chronic kidney disease (CKD), with diabetes slightly edging out hypertension for the number 1 slot.¹ Although Asian Americans have a tendency toward a lower body mass index (BMI) than the general population, this does not exclude them from developing diabetes or hypertension.

About 20% (1 in 5) of Asian-American adults have both diabetes and hypertension. In fact, Asian Americans with a BMI ≤ 25 often develop type 2 diabetes (T2DM), which is a direct contrast to other racial and ethnic groups in whom T2DM is more prevalent at higher BMIs. The current thinking is that Asian Americans have a higher percentage of body fat at lower BMIs.² Among racial and ethnic subgroups, Asian Americans have the highest prevalence of *undiagnosed* diabetes (close to 50%).²

In 2004, after adjusting for

lower BMI, McNeely and Boyko found that the incidence of diabetes in Asian Americans was 60% higher than in the Hispanic population.³ In 2015, this influenced the American Diabetes Association (ADA) to change its recommendation for diabetes screening in Asian Americans, lowering the threshold to a BMI of 23.⁴

Since abdominal or visceral fat is a risk factor for heart disease, hypertension, and diabetes, and it appears that the Asian-American population carries excess fat centrally, this population is also at risk for cardiac disease.⁵ For that reason, in this population, the American Heart Association recommends measuring waist circumference to screen for hidden abdominal adiposity.⁶

Thus, the trend you are seeing in your patient population is really only the tip of the iceberg. The Asian-American population is the fastest-growing ethnic group in the United States.³ It's time to update your diabetes screening protocols. —SWM

We were operating on a 58-year-old woman for a subcapital fracture of her right hip. The orthopedist mentioned that the patient had kidney disease

and that it probably caused her hip fracture. I didn't know kidney disease causes hip fractures. Is this true?

Evolving evidence suggests an association between diminishing renal function and increased risk for fracture. Here's a look at the available data:

Atherosclerosis Risk in Communities (ARIC) Study. During a median 13 years' follow-up of 10,955 community-based older adults, investigators identified higher albuminuria level and decreased creatinine-based estimated glomerular filtration rate (eGFR) as significant risk factors for fracture. Other risk factors included older age, race (Caucasians had the highest incidence), and sex (women were more likely than men to sustain a fracture). A nonlinear relationship was observed between eGFR and fracture diagnosis, with a graded association between fracture and albuminuria level.⁷

Cardiovascular Health Study. In this study of 4,699 older community-based adults, kidney function was assessed by measurement of serum cystatin C. During a mean follow-up of 7.1 years, higher cystatin C levels correlated to a higher risk for hip fracture in both sexes. In women, there was a significant association between diminishing renal function and hip fracture status: Those with lower eGFRs had a higher incidence of fractures. There was a similar magnitude of association among men, but it was not significant.⁸

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Renal Consult is edited by **Jane S. Davis, CRNP, DNP**, a member of the *Clinician Reviews* editorial board, who is a nurse practitioner in the Division of Nephrology at the University of Alabama at Birmingham and is the communications chairperson for the National Kidney Foundation's Council of Advanced Practitioners (NKF-CAP); and **Kim Zuber, PA-C, MSPS, DFAAPA**, a retired PA who works with the American Academy of Nephrology PAs and is also past chair of the NKF-CAP. This month's responses were authored by **Shushanne Wynter-Minott, DNP, FNP-BC**, who practices with Memorial Healthcare System in Hollywood, Florida, and **Cindy Smith, DNP, APRN, CNN-NP, FNP-BC**, who practices with Renal Consultants, PLLC, in South Charleston, West Virginia.

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Health, Aging and Body Composite Study. In 2,754 older adults, an association was noted between decreased femoral neck bone mineral density (BMD) and increased risk for fracture in those with and without CKD stage 3 to 5. With a concurrent diagnosis of osteoporosis, there was a 110% increased risk for nonspinal fracture in those with CKD and a 63% increased risk for those without CKD.⁹ In a study of 485 adult hemodialysis patients, decreased total hip and femoral neck BMD was associated with an increased risk for fractures in women with parathyroid hormone levels on the lower range of acceptable in this population (intact parathyroid hormone level [iPTH] < 204 pg/mL) and for spinal fractures in both genders.¹⁰

Bone changes associated with deterioration of renal function are complex and multifactorial. Human bone is a composite of protein fused to mineral crystals, primarily calcium and phosphate. Bone is dynamic, being broken down and rebuilt throughout adulthood, with the skeleton almost completely rebuilt every 10 years.¹¹

CKD-mineral and bone disorder (CKD-MBD) is a systemic disorder seen in those with kidney disease that affects bone and mineral metabolism. Its manifestations include abnormalities in the bone, calcifications of vascular and/or soft tissues, abnormal vitamin D metabolism, and disruptions in the phosphorus, calcium, and parathyroid hormone levels. These components, and the severity of the condition, vary by stage of CKD. One component of CKD-MBD, renal osteodystrophy, is associated with changes in

bone morphology and is definitively diagnosed by bone biopsy.¹²

Care of these patients is complex and can be compounded by osteoporosis and/or loss of bone strength. Osteoporosis, like CKD, increases in incidence with age and is associated with fracture risk.¹¹

While useful for diagnosing osteoporosis and predicting fracture risk in the general population, dual-energy X-ray densitometry (DXA) has not been recommended in those with CKD due to the type of bone changes that occur with diminished renal function.¹² However, evolving evidence regarding use of DXA in these patients prompted a Kidney Disease: Improving Global Outcomes (KDIGO) “controversies” conference to recommend reexamination of the evidence regarding this recommendation.¹³ KDIGO’s 2009 clinical practice guideline on CKD-MBD (<http://kdigo.org/home/mineral-bone-disorder/>) can be of benefit in the assessment and care of affected patients. —CS **CR**

REFERENCES

1. CDC. National Chronic Kidney Disease Fact Sheet, 2014. www.cdc.gov/diabetes/pubs/pdf/kidney_Factsheet.pdf. Accessed February 3, 2016.
2. Menke A, Casagrande S, Geiss L, Cowie CC. Prevalence of and trends in diabetes among adults in the United States, 1988-2012. *JAMA*. 2015;314(10):1021-1029.
3. McNeely MJ, Boyko EJ. Type 2 diabetes prevalence in Asian Americans: results of a national health survey. *Diabetes Care*. 2004;27(1):66-69.
4. American Diabetes Association. Standards of medical care in diabetes—2015: summary of revisions. *Diabetes Care*. 2015;38(suppl):S4.
5. Park YW, Allison DB, Heymsfield SB, Gallagher D. Larger amounts of visceral adipose tissue in Asian Americans. *Obes Res*. 2001;9(7):381-387.
6. Rao G, Powell-Wiley TM, Ancheta I, et al; American Heart Association Obesity Committee of the Council on Lifestyle and Cardio-metabolic Health. Identification of obesity and cardiovascular risk in ethnically and racially diverse populations: a scientific statement from the American Heart Association. *Circulation*. 2015;132(5):457-472.
7. Daya NR, Voskertchian A, Schneider ALC, et al. Kidney function and fracture risk: the Atherosclerosis Risk in Communities (ARIC) study. *Am J Kidney Dis*. 2016;67(2):218-226.
8. Fried LF, Biggs ML, Shlipak MG, et al. Association of kidney function with incident hip fracture in older adults. *J Am Soc Nephrol*. 2007;18:282-286.
9. Yencheck RH, Ix JH, Shlipak MG, et al. Bone mineral density and fracture risk in older individuals with CKD. *Clin J Am Soc Nephrol*. 2012;7(7):1130-1136.
10. Iimori S, Mori Y, Akita W, et al. Diagnostic usefulness of bone mineral density and biochemical markers of bone turnover in predicting fracture in CKD stage 5D patients—a single-center cohort study. *Nephrol Dial Transplant*. 2012;27:345-351.
11. Office of the Surgeon General (US). *Bone Health and Osteoporosis: a Report of the Surgeon General*. Rockville, MD: Office of the Surgeon General; 2004.
12. Kidney Disease: Improving Global Outcomes (KDIGO) CKD-MBD Work Group. KDIGO clinical practice guideline for the diagnosis, evaluation, prevention and treatment of chronic kidney disease-mineral and bone disorder (CKD-MBD). *Kidney Int Suppl*. 2009;113:S1-S130.
13. Ketteler M, Elder GJ, Evenepoel P, et al. Revisiting KDIGO clinical practice guideline on chronic kidney disease-mineral and bone disorder: a commentary from a Kidney Disease: Improving Global Outcomes controversies conference. *Kidney Int*. 2015;87(3):502-528.



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