

# CJASN

Clinical Journal of the American Society of Nephrology

October 2019 • Vol. 14 • No. 10

## Patient Voice

---

### 1417 Diet Patterns and Kidney Disease

Michael J. Lennon

See related editorial and article on pages 1419 and 1441, respectively.

## Editorials

---

### 1419 Can Dietary Patterns Modify Risk for CKD?

Emily A. Hu and Casey M. Rebholz

See related Patient Voice and article on pages 1417 and 1441, respectively.

### 1421 Biomarkers to Predict Progression in IgA Nephropathy

Chee Kay Cheung and Jonathan Barratt

See related article on page 1458.

### 1424 Dietary Phosphorus and FGF23: Is More Restriction Better?

Kathleen M. Hill Gallant

See related article on page 1475.

### 1427 Is Hypertension Following Donor Nephrectomy Cause For Elevated Living Donor Kidney Function Concern?

William S. Asch

See related article on page 1493.

### 1430 Persistent Disparities in Preemptive Kidney Transplantation

Tanjala S. Purnell and Deidra C. Crews

See related article on page 1500.

## Original Articles

---

### Acute Kidney Injury and ICU Nephrology

#### 1432 Kidney Support in Children using an Ultrafiltration Device: A Multicenter, Retrospective Study

Shina Menon, John Broderick, Raj Munshi, Lynn Dill, Bradley DePaoli, Sahar Fathallah-Shaykh, Donna Claes, Stuart L. Goldstein, and David J. Askenazi

### Chronic Kidney Disease

#### 1441 Healthy Dietary Patterns and Incidence of CKD: A Meta-Analysis of Cohort Studies

Katrina E. Bach, Jaimon T. Kelly, Suetonia C. Palmer, Saman Khalesi, Giovanni F. M. Strippoli, and Katrina L. Campbell  
See related Patient Voice and editorial on pages 1417 and 1419, respectively.

#### 1450 Incidence of ESKD and Mortality among Children with Congenital Heart Disease after Cardiac Surgery

Chirag R. Parikh, Jason H. Greenberg, Eric McArthur, Heather Thiessen-Philbrook, Allen D. Everett, Ron Wald, Michael Zappitelli, Rahul Chanchlani, and Amit X. Garg

### Glomerular and Tubulointerstitial Diseases

#### 1458 Plasma Galactose-Deficient IgA1 and C3 and CKD Progression in IgA Nephropathy

Pei Chen, Guizhen Yu, Xue Zhang, Xinfang Xie, Jinwei Wang, Sufang Shi, Lijun Liu, Jicheng Lv, and Hong Zhang  
See related editorial on page 1421.

## Original Articles (Continued)

---

### Maintenance Dialysis

- 1466 Peritoneal Dialysis Patient Outcomes under the Medicare Expanded Dialysis Prospective Payment System**  
*Eric W. Young, Alissa Kapke, Zhechen Ding, Regina Baker, Jeffrey Pearson, Chad Cogan, Purna Mukhopadhyay, and Marc N. Turenne*
- 1475 Short-Term Effects of Very-Low-Phosphate and Low-Phosphate Diets on Fibroblast Growth Factor 23 in Hemodialysis Patients: A Randomized Crossover Trial**  
*Wan-Chuan Tsai, Hon-Yen Wu, Yu-Sen Peng, Shih-Ping Hsu, Yen-Ling Chiu, Ju-Yeh Yang, Hung-Yuan Chen, Mei-Fen Pai, Wan-Yu Lin, Kuan-Yu Hung, Fang-Yeh Chu, Shu-Min Tsai, and Kuo-Liong Chien*  
*See related editorial on page 1424.*

### Transplantation

- 1484 Infection-Related Mortality in Recipients of a Kidney Transplant in Australia and New Zealand**  
*Samuel Chan, Elaine M. Pascoe, Philip A. Clayton, Stephen P. McDonald, Wai H. Lim, Matthew P. Sypek, Suetonia C. Palmer, Nicole M. Isbel, Ross S. Francis, Scott B. Campbell, Carmel M. Hawley, and David W. Johnson*
- 1493 Self-Reported Incident Hypertension and Long-Term Kidney Function in Living Kidney Donors Compared with Healthy Nondonors**  
*Courtenay M. Holscher, Christine E. Haugen, Kyle R. Jackson, Jacqueline M. Garonzik Wang, Madeleine M. Waldram, Sunjae Bae, Jayme E. Locke, Rhiannon D. Reed, Krista L. Lentine, Gaurav Gupta, Matthew R. Weir, John J. Friedewald, Jennifer Verbesey, Matthew Cooper, Dorry L. Segev, and Allan B. Massie*  
*See related editorial on page 1427.*
- 1500 Trends in Disparities in Preemptive Kidney Transplantation in the United States**  
*Kristen L. King, Syed Ali Husain, Zhezhen Jin, Corey Brennan, and Sumit Mohan*  
*See related editorial on page 1430.*
- 1512 Circulating Advanced Glycation Endproducts and Long-Term Risk of Cardiovascular Mortality in Kidney Transplant Recipients**  
*Camilo G. Sotomayor, Antônio W. Gomes-Neto, Marco van Londen, Rijk O. B. Gans, Ilja M. Nolte, Stefan P. Berger, Gerjan J. Navis, Ramón Rodrigo, Henri G. D. Leuvenink, Casper G. Schalkwijk, and Stephan J. L. Bakker*

## Research Letter

---

- 1521 The Association of Fenofibrate with Kidney Tubular Injury in a Subgroup of Participants in the ACCORD Trial**  
*Kinsuk Chauhan, Girish N. Nadkarni, Neha Debnath, Lili Chan, Aparna Saha, Amit X. Garg, Chirag R. Parikh, and Steven G. Coca*

## Erratum

---

- 1524 Correction**

## Kidney Case Conference: How I Treat

---

- 1525 Vaccinating the Patient with ESKD**  
*Sana F. Khan and Brendan T. Bowman*
- 1528 Intravenous Iron Use in the Care of Patients with Kidney Disease**  
*Iain C. Macdougall*

## Perspectives

---

- 1531 Real World Data and Evidence: Support for Drug Approval: Applications to Kidney Diseases**  
*Aliza M. Thompson and Mary Ross Southworth*
- 1533 Post-PIVOTAL Iron Dosing with Maintenance Hemodialysis**  
*David Collister and Navdeep Tangri*

### 1536 Interoperability of Electronic Health Information and Care of Dialysis Patients in the United States

*Paul R. Sutton and Thomas H. Payne*

## Feature

---

### 1539 A Technology Roadmap for Innovative Approaches to Kidney Replacement Therapies: A Catalyst for Change

*Joseph V. Bonventre, Frank P. Hurst, Melissa West, Iwen Wu, Prabir Roy-Chaudhury, and Murray Sheldon*

#### On the Cover

*What's the diagnosis?*

A 41-year-old male with type 2 diabetes mellitus taking dapagliflozin, one of sodium-glucose cotransporter-2 (SGLT2) inhibitors, 5 mg daily, was admitted to our hospital, with oliguric acute kidney injury. He reported no history of being exposed to IV contrast or other agents. Ultrasonography scans revealed no evidence of urinary tract obstruction, heart failure, or cirrhosis. Laboratory examination showed blood glucose of 74 mg/dL, hemoglobin A1c of 6.1%, and serum creatinine of 3.0 mg/dL (baseline 1.1 mg/dL). Urinalysis was positive for glucose (+4) with osmolality of 836 mOsm/kg, and negative for protein, occult blood, crystals, or sediment abnormalities.

A histological preparation of kidney revealed focal isometric vacuolization in the proximal tubules (Figure 1) and pale periodic acid-Schiff (PAS)-positive glycogen accumulation within the cytoplasm of epithelial cells (Figure 2). Electron microscopy showed cytoplasmic vacuoles in the proximal tubules with preserved brush borders (Figure 3). A diagnosis of osmotic nephropathy, most likely due to dapagliflozin, was made. His physical status and serum creatinine level returned to normal after normal saline infusion and dapagliflozin discontinuation.

Osmotic nephropathy describes structural changes with vacuolization and swelling of the proximal tubules that obstruct urine flow, resulting in oliguric acute kidney injury. The known agents that cause osmotic nephropathy, include mannitol, contrast media and intravenous immunoglobulin. The similar lesion was first described in patients with poorly controlled diabetes or diabetic ketoacidosis in the late 1800s. However, it has been rarely seen for nearly a century, after the advent of insulin therapy and subsequent glucose lowering agents. Although it is premature to conclude that SGLT2 inhibitors caused osmotic nephropathy because of underlying diabetes and being based on a single case, and therefore needs further evaluation, this lesion could be associated with SGLT2 inhibitors, since these agents particularly increase the amount of urinary glucose, even on the condition of euglycemia, resulting in severe hyperglycosuria, that imposes a similar situation with the morphogenesis of osmotic nephropathy.

*(Images and text were provided by Masayuki Yamanouchi, MD, MPH, Shun Watanabe, MD, Junichi Hoshino, MD, Yoshifumi Ubara, MD, Toranomon Hospital, Tokyo, Japan; Yutaka Yamaguchi, MD, Department of Pathology, Teikyo University School of Medicine, Tokyo, Japan; and Kenichi Ohashi, MD, Department of Pathology, Yokohama City University Graduate School of Medicine, Kanagawa, Japan)*