Patient Voice

439 Distance from a Transplant Center and Getting Listed for a Transplant
Lisa Garner
See related editorial and article on pages 453 and 539, respectively.

Editorials

441 Ambulatory BP Phenotypes and Their Association with Target Organ Damage and Clinical Outcomes in CKD
Panagiotis I. Georgianos and Rajiv Agarwal
See related articles on pages 455 and 501, respectively.

444 Liraglutide for the Treatment of Type 2 Diabetes and Safety in Diabetic Kidney Disease: Liraglutide and Diabetic Kidney Disease
David Z. Cherney and Katherine R. Tuttle
See related article on page 465

447 Kidney Failure with Urinary Tract Cancers
Ankur Shah and Susie L. Hu
See related article on page 484

450 The Value of Primary Care Provider Involvement in the Care of Kidney Failure Patients on Dialysis: Finding the Balance
Salman Ahmed and Mallika L. Mendu
See related article on page 521

453 The Long Road to Kidney Transplantation: Does Center Distance Impact Transplant Referral and Evaluation?
Tanjala S. Purnell and Mara McAdams-DeMarco
See related Patient Voice and article on pages 439 and 539, respectively.

Original Articles

Chronic Kidney Disease

455 Association of 24-Hour Ambulatory Blood Pressure Patterns with Cognitive Function and Physical Functioning in CKD
See related editorial and article on pages 441 and 501, respectively.

465 Safety of Liraglutide in Type 2 Diabetes and Chronic Kidney Disease
Johannes F.E. Mann, Vivian A. Fonseca, Neil R. Poulter, Itamar Raz, Thomas Idorn, Søren Rasmussen, Bernt Johan von Scholten, and Otri Mosenzon, on behalf of the LEADER Trial Investigators
See related editorial on page 444.

Clinical Nephrology

474 Nephrology Fellows’ and Program Directors’ Perceptions of Hospital Rounds in the United States
Clinical Nephrology (Continued)

484  Trends and Outcomes with Kidney Failure from Antineoplastic Treatments and Urinary Tract Cancer in France
Imène Mansouri, Natalia Alencar de Pinho, Renaud Snanoudj, Christian Jacquelinet, Mathilde Lassalle, Clémence Béchade, Cécile Vigneau, Florent de Vathaire, Nadia Haddy, and Bénédicte Stengel,
on behalf of the French REIN registry
See related editorial on page 447.

Hypertension

493  Prognostic Value of Ambulatory Blood Pressure Load in Pediatric CKD
Jason Lee, Charles E. McCulloch, Joseph T. Flynn, Joshua Samuels, Bradley A. Warady, Susan L. Furth, Divya Seth, Barbara A. Grimes, Mark M. Mitsnefes, and Elaine Ku

501  Ambulatory Blood Pressure Phenotypes in Adults Taking Antihypertensive Medication with and without CKD
Stanford E. Mwasongwe, Rikki M. Tanner, Bharat Poudel, Daniel N. Pugliese, Bessie A. Young, Marwah Abdalla, Solomon K. Musani, Orlando M. Gutiérrez, Adolfo Correa, Daichi Shimbo, and Paul Muntner
See related editorial and article on pages 441 and 455, respectively.

Maintenance Dialysis

511  A Systematic Review and Jurisdictional Scan of the Evidence Characterizing and Evaluating Assisted Peritoneal Dialysis Models
Mark Hofmeister, Scott Klarenbach, Lesley Soril, Nairne Scott-Douglas, and Fiona Clement

521  Association of Primary Care Involvement with Death or Hospitalizations for Patients Starting Dialysis
See related editorial on page 450.

530  Association of Tubular Solute Clearance with Symptom Burden in Incident Peritoneal Dialysis
Ke Wang, Michelle Nguyen, Yan Chen, Andrew N. Hoofnagle, Jessica O. Becker, Leila R. Zelnick, John Kundzins, Anne Goodling, Jonathan Himmelfarb, and Bryan Kestenbaum

Transplantation

539  Distance to Kidney Transplant Center and Access to Early Steps in the Kidney Transplantation Process in the Southeastern United States
Laura J. McPherson, Vaughn Barry, Jane Yackley, Jennifer C. Gander, Stephen O. Pastan, Laura C. Plantinga, Sudeshna Paul, and Rachel E. Patzer, on behalf of the Southeastern Kidney Transplant Coalition
See related Patient Voice and editorial on pages 439 and 453, respectively.

Genomics of Kidney Disease

550  Single Cell Sequencing and Kidney Organoids Generated from Pluripotent Stem Cells
Haojia Wu and Benjamin D. Humphreys

Kidney Case Conference: How I Treat

557  Intravascular Volume Assessment in the Critically Ill Patient
Jean-Louis Vincent

Perspectives

560  Consenting for Dialysis or Its Alternative: Systematic Process Is Needed
Kelly Chenlei Li and Mark A. Brown

563  Contraception and CKD
Anna Burgner and Michelle A. Hladunewich

566  Making Assisted Peritoneal Dialysis a Reality in the United States: A Canadian and American Viewpoint
Matthew J. Oliver and Page Salenger
**On the Cover**

**What is the diagnosis?**

A 51-year-old male with normal baseline kidney function and a history of diabetes mellitus and arterial hypertension for 20 years presented with fatigue, edema, oligoanuria, and impaired kidney function 2 weeks after an upper respiratory tract infection. At admission, serum creatinine was 1.76 mg/dl (eGFR, 51 ml/min per 1.73 m$^2$), with elevated white blood cells and C-reactive protein, positive antistreptolysin O antibodies test, active urine sediment, and proteinuria (9 g/day). The patient became anuric and dialysis dependent. The first kidney biopsy revealed acute, postinfectious glomerulonephritis with well-defined lesions of diabetic nephropathy. Serum C3 was initially low, with normal serum C4, rheumatoid factor, anti–nuclear autoantibodies, and anti–neutrophil cytoplasmic autoantibodies. No autoantibodies against complement factor H or C3 or C4 nephritic factors were detected, whereas C5b-9 was slightly increased. He received antimicrobial therapy, supportive care, dialysis, and pulses of glucocorticoids. The second biopsy a month later was unchanged. The patient remained on dialysis for 3 months and progressively improved. His serum C3 level returned to normal, and he ended dialysis with an eGFR of 20 ml/min per 1.73 m$^2$.

**Image description**

The first kidney biopsy revealed 8/26 globally sclerosed glomeruli (31%). In both biopsies, the dominant finding by light microscopy was diffuse proliferative and exudative glomerulonephritis with significant endocapillary proliferation and numerous neutrophils. In addition, diffuse mesangial expansion and well-defined mesangial Kimmelstiel-Wilson nodules were seen (left and left center images). Immunofluorescence revealed strong C3 expression (3–4+) in a diffuse, coarsely granular pattern along the glomerular capillaries and focally in the mesangium (right center image). There was no staining for IgA, and only trace IgM and IgG were found. Interstitial fibrosis and arteriosclerosis were moderate (30%). Electron microscopy revealed numerous, large subepithelial electron-dense deposits (humps) situated on moderately thickened basement membranes. Plentiful neutrophils were seen in the glomerular lumena (right image).

**Teaching points**

Poststreptococcal glomerulonephritis (PSGN) is an immunological-mediated glomerular lesion caused by prior infection, with specific nephritogenic stains of group Aβ-hemolytic streptococcus. Histologically, it is characterized by exudative glomerular injury, dominant C3 staining, and subepithelial humps. The clinical picture varies from asymptomatic to rapidly progressive glomerulonephritis. Although it is considered a self-limited condition, especially in children, it may occasionally follow a rather persistent course, leading to chronic kidney insufficiency. Patients with pre-existing pathology, where PSGN is superimposed, have been reported to have a poor outcome. Specifically, patients with comorbidities, such as diabetes mellitus, hypertension, smoking, and alcoholism, are more likely to end up on chronic dialysis.

For patients with PSGN who require or are progressing toward dialysis treatment, a kidney biopsy is mandatory in the acute phase to confirm the diagnosis and exclude other conditions that may present with acute glomerulonephritis and hypocomplementemia, such as C3 glomerulopathy, cryoglobulinemic glomerulonephritis, lupus nephritis, membranoproliferative glomerulonephritis, and IgA-dominant, staphylococcus-associated glomerulonephritis. The pattern of hypocomplementemia and its duration (the disease time-course), i.e., acute onset versus persistent-recurrent active glomerulonephritis over a prolonged period, in correlation with histopathology, depict the diagnosis. Clinically, a critical distinction pertains to the time of infection occurrence; prior to PSGN or coincidentally with the IgA-dominant, staphylococcus-associated glomerulonephritis.

Left image: A large glomerulus from the first biopsy with a significant number of inflammatory cells, mostly neutrophils, into distended capillary lumena. Thick basement membranes, diffuse mesangial matrix increase, and a well-formed mesangial nodule at the bottom right can be appreciated (H&E ×400).

Left center image: A large glomerulus from the second biopsy with extensive neutrophil infiltration in association with distension of glomerular lumena, superimposed on mesangial expansion caused by diabetes (H&E ×400).

Right center image: Diffuse, coarsely granular deposits along the glomerular capillary walls and focally in the mesangial regions, in a starry sky appearance (C3 ×400).

Right image: Electron microscopy revealed numerous and large subepithelial, electron-dense deposits (humps) situated on moderately thickened basement membranes. Plentiful neutrophils were seen in the glomerular lumena (uranyl acetate and lead citrate ×4400).

*These authors contributed equally to this work.

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**Feature**

**569 The Changing Landscape of Fabry Disease**

_Einar Svarstad and Hans Peter Marti_

**Review**

**577 Metabolic Reprogramming in Autosomal Dominant Polycystic Kidney Disease: Evidence and Therapeutic Potential**

_Kristen L. Nowak and Katharina Hopp_