Autopsy Case Reports

Editorial

Autopsy kidneys: an overlooked resource

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Chronic kidney disease (CKD) is a global health crisis, with an estimated prevalence of 8-16% worldwide.[1] In people aged 65-74, 1 in 5 men and 1 in 4 women have CKD. Well-known complications of acute and chronic kidney disease include cardiovascular disease and death, end stage renal disease (ESRD), infections, mineral and bone disorders, anemia, and cognitive decline. What may be underappreciated is that kidney disease is deadly, consistently reported as the 9th leading cause of death in the United States.[2] In fact, more than 90,000 Americans die from kidney diseases annually, which exceeds the number of combined deaths from breast and prostate cancer. Yet how often do pathologists invoke kidney disease as the cause of death at autopsy? Are pathologists adequately trained to recognize medical renal diseases in autopsy specimens? Since kidney biopsy is usually avoided in critically ill patients, histologic evaluation of autopsy kidneys may be the first and only opportunity to identify these diseases. This is crucial as these findings may have implications for the surviving family members, particularly for those diseases with a genetic component.

We recently conducted a retrospective histologic review of adult autopsy kidneys at our institution in order to 1) establish a baseline of medical renal diseases which the autopsy pathologist can expect to encounter, and 2) determine the incidence of missed diagnoses. In addition to frequent findings of acute tubular injury and arterionephrosclerosis, we detected a wide variety of significant renal pathology in one-third of adult autopsies over a 2-year span.[3] Common lesions included diabetic nephropathy, thrombotic microangiopathy, glomerulonephritis (frequently infection-related), diseases related to underlying hematologic malignancies, and toxic/metabolic tubulointerstitial diseases. Review of the corresponding autopsy reports reveals that most of these lesions (60%) were not identified. Unfortunately, this deficiency was not surprising given the recent literature demonstrating that nonneoplastic renal diseases are often missed in tumor nephrectomy specimens.[4-8]

There are several possible reasons why a pathologist might commit a diagnostic error by overlooking a disease process at autopsy. The primary emphasis during autopsy examination is identification of the immediate cause of death, which results in a more dedicated examination of the organs frequently involved in devastating events (i.e. heart, lungs, and brain). Surgical pathology practices have become increasingly subspecialized, so pathologists are also likely to focus on their organ system(s) of expertise. We also speculate that many pathologists are not adequately trained to recognize medical diseases in autopsy kidney specimens. Our study demonstrates a knowledge gap that needs to be addressed, and also provides a mechanism for addressing it. Autopsy pathology, including medical renal pathology, is a rich educational resource that should be emphasized in residency training.

The deficiency in knowledge regarding renal pathology is most likely due to limited exposure and the current training practices in pathology residency programs. In an effort to address this deficiency in the

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US, the Accreditation Council for Graduate Medical Education (ACGME) included the requirement of renal pathology in the anatomic pathology curriculum for pathology residents effective July 1, 2015. One of the challenges in developing a renal pathology curriculum to meet the ACGME requirement is the perceived scarcity of teaching material. Medical renal pathology is a small and highly subspecialized field, requiring integration of clinical and laboratory data with light, immunofluorescence, and electron microscopic techniques. Kidney biopsy services and fellowship-trained nephropathologists are typically centralized in large academic pathology departments. Institutions with smaller pathology programs may struggle to develop a renal pathology curriculum. Our study provides one solution to this problem by establishing autopsy kidney specimens as a rich source of medical renal pathology for diagnostic and teaching purposes. In fact, autopsy kidneys likely provide a more accurate picture of the spectrum and frequency of kidney disease in the general population than for-cause renal biopsies. Based on our own departmental experience, we advocate a dedicated renal pathology rotation early in residency training, followed by reinforcement over subsequent years through one-on-one review of autopsy kidneys and the non-neoplastic parenchyma in tumor nephrectomies with renal pathologists. Autopsy kidneys can easily be incorporated into didactic lectures and unknown slide sessions, particularly in residency programs with fewer medical renal biopsies. Our implementation of this curriculum has met with great success and positive feedback.

There are certain challenges to assessment of the kidneys at autopsy, particularly given the desire to minimize costs, and no standard guidelines have been established for their proper evaluation. Several recent reviews have detailed suggested approaches to autopsy renal pathology including gross examination, tissue allocation, and ancillary studies, in addition to medical record review.[9,10] We would emphasize the importance of systematic evaluation of all four compartments of renal parenchyma on the H&E stain, namely the glomeruli, tubules, interstitium, and vessels. In fact, most lesions can be identified or strongly suspected based on H&E staining alone, precluding the time and cost of ancillary studies.

Unfortunately, the value placed on the autopsy has declined over the past few decades due to a combination of factors including lack of reimbursement, clinical disinterest, advances in premortem diagnostic techniques, and risk of litigation. Autopsy rates dropped precipitously in the US after the Joint Commission on Accreditation discontinued their hospital autopsy mandate in 1971 and Medicare stopped reimbursement in 1986. Many physicians are concerned that current hospital autopsy rates have declined to approximately 10% of hospital deaths,[11,12] down from a 70% or higher rate in teaching hospitals in the 1960s.[13] It has been well-documented that the hospital autopsy provides invaluable epidemiological data and significantly contributes to quality control and improvement of patient care.[11,14-16] In the College of American Pathologists Q-Probes Study,[17,18] an unexpected disease finding that contributed to a patient's death was identified in 39.7% of 2479 autopsies from 248 institutions. The same study also determined that 93.0% of clinical questions were resolved by the autopsy. In addition to the clinical relevance of the postmortem examination in current medical practice, the hospital autopsy provides a valuable educational tool for both residents and medical students. The autopsy epitomizes problem-based learning and clinicopathologic correlation as well as providing valuable material for learning gross and histologic examination, including medical renal pathology. Encouragingly, both internal medicine and pathology residents at a large academic teaching hospital assign high importance to autopsies in terms of education, answering clinical questions, public health, and research.[19] It is imperative that academic pathologists emphasize the value of the autopsy to our pathologists-in-training.

Our institutional review highlights a knowledge gap that is pertinent to all practicing pathologists, who should be aware that medical renal disease is common in adult autopsy kidney specimens but is often overlooked. The autopsy has long been recognized for providing important contributions in medical education and quality improvement of care, and autopsy kidney specimens are a valuable source of material to supplement training in anatomic pathology. Furthermore, our understanding of the natural history and pathogenesis of kidney disease will improve with accurate recognition and reporting of kidney diseases at autopsy.

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