

Who and What Drove Walter Kempner? The Rice Diet Revisited

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The refugee with the strong German accent explained his ideas about renal failure to his skeptical medical students. “The problem with renal failure is the resultant metabolic dysfunction. The kidneys excrete waste products, amino acids, keto-acid metabolites, hydrogen ions, the salt that is eaten, and all these things are the result of what the people are eating. Theoretically, we should be able to make them better by reducing the amount of work the kidneys have to do. Namely, we could radically alter the patients’ diets and thereby save lives.” The (Duke University) students challenged the Herr Professor. “Sounds cool but prove it!” And so he did. The ideas behind this gallant hypothesis were not that novel. Others had prescribed various similar ideas about reducing renal work by modifying the diet, particularly in terms of sodium content.¹ However, they had not been that successful in sending the kidneys on vacation.² Kempner introduced the first comprehensive (global) dietary program to treat chronic renal disease. By doing so, he revolutionized not only that disease but also the treatment of hypertension, obesity, and a host of other disorders.³ Furthermore, perhaps unintentionally he raised the issue of lifestyle, because following his regimen required a change in just that. His own contribution, the Kempner name, the times in Germany and elsewhere, the environment, the technical advances, and the driving force behind a young medical faculty and its visionary leaders should not be forgotten. The ideas that Kempner left us have been archived by remarkable associates and contemporaries, whose memories, such as Newborg⁴ and Stead,⁵ guide us in terms of our current interpretations. Without them, we would have missed much of Kempner’s work, and some of us would have had less tachycardia at grand rounds.⁶

The Case

The 49-year-old diabetic hypertensive patient was admitted to Duke University Hospital because of shortness of breath. His family members had died mostly of myocardial infarction and stroke. Renal failure was also in the family history, albeit irrelevant because there was no treatment then available. The patient had been overweight all his life. The admitting blood pressure was 200/130 mmHg. Examination disclosed papilledema and malignant hypertensive eye ground changes

bilaterally. The neck veins were distended, and the breath sounds were diminished bilaterally in an area where dullness was increased; above the lung bases, rales were audible. A third heart sound was apparent. The liver was enlarged, and copious (4+) peripheral edema was evident. The protein excretion was >1.5 g per day. Phenothalein excretion after intravenous injection was diminished. The nonprotein nitrogen concentration was increased; the hematocrit was decreased as were the plasma proteins.

What Is to be Done With Such a Patient (in 1939–1949 or Later)?

Kempner, on the basis of his earlier cell metabolic studies and experiences in German departments of internal medicine, adapted a regimen to comply with the medical students’ challenge. The diet he designed consisted almost entirely of rice and fruit. The diet provided ≈2000 calories per day. Kempner occasionally reluctantly permitted addition of breads or treats. In essence, the diet comprised 4% to 5% protein (<20 g per day), 2% to 3% fat, and the rest was complex carbohydrates. The sodium content was 150 mg (<10 mmol/d). Fluid intake per day was restricted. Kempner was aware that white rice might be thiamine deficient and included a vitamin preparation. He also included citrate-containing fruit juices with the idea that any metabolic acidosis could be counteracted that way. If we compare that regimen with the US diet of then (and now), we observe 25% protein, 25% fat, and 50% carbohydrates. Furthermore, the daily salt intake would entail ≈9 g (Na⁺ and Cl⁻, 150–160 mmol). Thus, the Kempner diet was (dramatically) low in salt (Na⁺, ≈10 mmol/d), low in protein (<20 g/d), low in fat, and high in complex carbohydrates. Kempner was interested in winning the clinical battle, less in which constituent (salt, calories, protein, carbohydrates, or fats) was the most important regarding any particular separate effects. Results from this patient are shown in Figure 1.

Our interests here are multiple. Obviously, the dietary intervention is provocative, although others had grasped after this brass ring earlier.¹ Furthermore, have current medical advances made such dramatic dietary interventions irrelevant? Finally, what was the driving force in the method of thought

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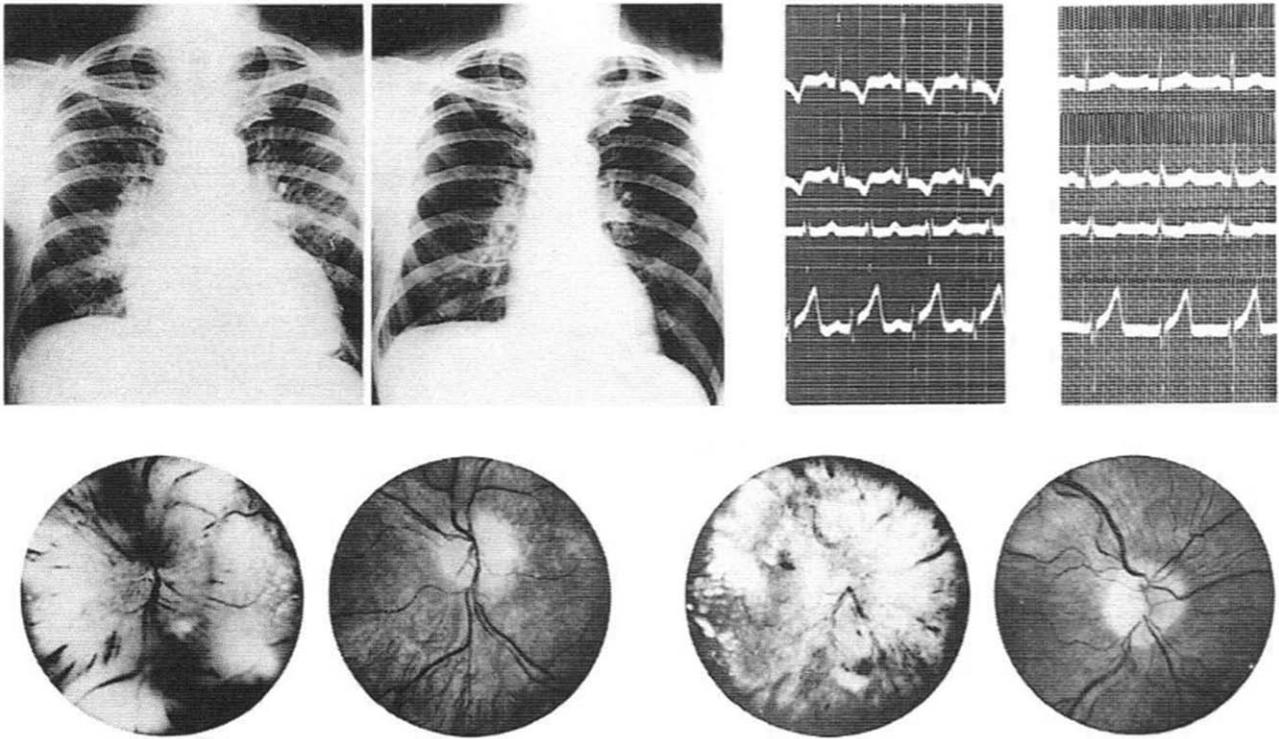


Figure 1. Anecdotes do not make a summer. However, improvements in the cardiac silhouette, the ECG, and the ophthalmic retinal photographs after initiation of diet cannot be denied.¹⁵

behind Walter Kempner that caused him to swim against the stream?

Discussion

Kempner and New Dahlem

Walter Kempner (1903–1997) was the third child of Walter Kempner Sr and Lydia Rabinowitsch-Kempner; they were assimilated German Jews. His parents were both bacteriologists working on tuberculosis and were affiliated with Robert Koch in Berlin. Kempner's mother had been professor of pathology at Women's Medical College in Philadelphia. Kempner's older brother, Robert, was a German-educated lawyer who left Germany over Italy to come to the United States. Robert Kempner was the assistant to Robert Jackson, prosecutor of Nazi war criminals at Nürnberg. He returned to Germany after the war, settled in Frankfurt, and prosecuted other Nazi war criminals at the Wilhelmsstraße trials where he first presented the Wannsee protocols as written, documenting premeditated evidence leading to the holocaust. Kempner's older sister, Nadja, completed a PhD in German literature at the University of Heidelberg but died tragically of tuberculosis thereafter, the disease that also claimed Kempner's father. The Kempner children grew up in pre-World War I Berlin in a prosperous, intellectually rich, privileged family. The parents, although professionally busy, took time to assure excellent educations for their children. All attended superb preparatory schools (Gymnasium). Walter Kempner directed *Antigone* (Sophocles) as a high-school student to honor his favorite teacher. The production was conducted entirely in ancient Greek.

Kempner began his medical studies in Berlin, but shortly thereafter transferred to the University of Heidelberg. The

reasons were not solely related to his medical studies. The German poet Stefan George (1868–1933) fascinated Kempner. George was at the center of an influential literary and academic circle known as the George-Kreis that included many of the young leading writers and intellectuals of the time. George and his writings were identified with the Conservative Revolutionary movement, which advocated new conservatism and nationalism. The members based their ideas on organic rather than materialistic thinking, on quality rather than quantity, and promoted what they regarded to be the productive power of modernity. The historian Fritz Stern stated that the movement was “a tribute to the genuine spiritual quality of the conservative revolution—that the reality of the Third Reich aroused many of them to opposition, sometimes silent, often open, and costly.”⁷⁷ Claus von Stauffenberg, who conspired the plot against Hitler, was also a member of the George-Kreis. Kempner befriended George, joined the Circle, and was instrumental in caring for the ailing poet until the latter's death in 1933. We think that Kempner's participation in the George-Kreis influenced his thinking and character, particularly regarding the zeal and creative stubbornness that Kempner later exhibited.

During his studies, Kempner made numerous friends who would be important to him throughout his life, some of whom also eventually landed in Durham. Notable is Dr Clothilde Schlayer, who was also involved in the care of Stefan George. Kempner graduated in 1928 and interned with Ludolf Krehl in Heidelberg. This superb clinical training was continued in Berlin when Kempner received further training from Gustav von Bergmann. But the most important part of his postgraduate education was his time with the Nobel laureate Otto Warburg.

“Do you know any chemistry?” “No,” Kempner replied. “How about physics?” Another “No” followed. “We don’t have any room for you, but you can sit in the corner for a couple of weeks and watch if you wish,” Warburg replied. Off-and-on, Kempner spent 3 years with Warburg. Three scientists who worked in Warburg’s laboratory, including Sir Hans Krebs, went on to win the Nobel Prize. Here, Kempner enjoyed a superb education in metabolism. When the first anti-Jewish laws were introduced in Germany in 1933, Kempner was dismissed from any clinical positions and he began to look for work outside Germany. The road to Durham was not straightforward. Kempner was reluctant to leave Germany because many thought the Nazi spook could only be a transient state of affairs and that Germans would come to their senses. Thus, an initial offer at Johns Hopkins was refused. By 1934, matters had deteriorated further. Dr Frederic Hanes (1883–1946), Chairman of Medicine, offered Kempner a 2-year contract. The Rockefeller Institute that also funded Max-Delbrück assisted in the financing.

The Perlzweigs from the Biochemistry Department took Kempner in. Judith Perlzweig subsequently dutifully reported: “His English was terrible, the vocabulary sub-basic, the grammar poor, the meaning obscured by an extraordinarily heavy German accent. Kempner resolutely hacked out his sentences as if clearing a path through jungle undergrowth with a machete.” Nevertheless, he worked hard, also to secure the entry of Dr Clothilde Schlayer, who moved to Durham to join his research on the Warburg apparatus. An impressive series of articles quickly followed, sufficient to get the appointment extended.^{8–10} Kempner and Schlayer¹¹ returned to Germany in 1935 to care for Kempner’s mother who was dying. It proved to be Kempner’s last trip to Germany. Back in Durham, Kempner and Schlayer continued work on cell metabolism also in bacterial cells. The quality of the work was sufficient to garner an invitation to Cold Springs Harbor. In the mean time, Kempner battled his way to clinical licensure. The North Carolinians were suspicious. But when one of his examiners asked Kempner, “where the best medicine was practiced, in the United States or in Germany?” Kempner adroitly answered: “The best medicine now practiced in the world is in North Carolina.” “You’re all right; you are our man,” answered the convinced examiner.

In addition to Clothilde Schlayer, Kempner successfully navigated other German expatriates to Durham, including Ernst Peschel and Ruth Lohmann Peschel.¹² The result was not only an ever-efficient clinical and laboratory team but also a small colony in Durham named after Dahlem, a suburb of Berlin from where Kempner came and where Warburg’s institute was located. Kempner also captured American talent, most notably, Barbara Newborg.³

Rice Diet

Recruiting patients for the rice diet was initially sluggish but gained momentum as successes mounted. The data were first presented nationwide in Chicago at the 1944 American Medical Association convention. The audience was stunned. However, skeptical physicians accused Kempner of reversing the dates on the chest roentgenograms and ECGs, thereby implying fraud. “Those damn Yankees,” retorted Dr Hanes.

The *JAMA* rejected the manuscript for publication, as did *Archives of Internal Medicine*. However, *North Carolina Medical Journal* published the work, demanding hefty page charges.^{13–17} Kempner kept meticulous records including roentgenograms, ECGs, and fundus photographs, collected blood and urine, followed renal function (nonprotein nitrogen, creatinine, chloride excretion), and monitored glucose and serum cholesterol. The flame photometer would not make its appearance until the 1950s, and routine acid–base balance (CO₂ combining power) determination was only on the horizon.

The rice diet did not cure everybody. In Kempner’s original cohort of 192 people, 25 patients died. Of the remaining 167, 60 patients did not substantially improve their blood pressure values. However, 107 patients showed significant improvement (from 200/112 mm Hg to 149/96 mm Hg) with the diet. Heart size decreased in 66 of 72 patients. Serum cholesterol was reduced in 73 of 82 patients. Retinopathy was reduced or disappeared completely in 21 of 33 patients. We must keep these results in context with the times, during which the life expectancy of anyone with malignant hypertension was 6 months. Sympathectomy seemed to improve that state of affairs, but not in all patients. Understandably, improved and healed patients became zealous supporters of Kempner and his cause. As a result, other physicians elsewhere adopted use of the rice diet. Kempner’s next noteworthy presentation was at the New York Academy of Medicine. Kempner successfully defended his report against attacks from skeptics. He pointed out that months might be necessary for success and defended applicability in malignant hypertension, renal failure, heart failure, and their combinations.¹⁷ An example from a patient managed with best-available treatment at the time, well known to the authors, is shown in Figure 2.

The rice diet was subsequently extended to patients with nephrotic syndrome, hypercholesterolemia, diabetes mellitus, atherosclerosis, and subsequently obesity.¹⁶ And it worked, not in all patients but in many, for whom no other therapeutic options were open. There were numerous successes and reports with the rice diet. In 1947, Eugene A. Stead Jr,⁵ the renowned clinician/scientist and medical educator mentioned earlier, succeeded Frederic Hanes as Chief of Medicine at Duke University. Although William Osler is generally credited with defining the state and practice of clinical medicine earlier in the 19th century, few would dispute Dr Stead’s subsequent importance as a pre-eminent medical educator of the 20th century.

We cannot improve on Stead’s commentary.¹⁸ We include a brief summary of his poignant comments: “All dieters are liars and therefore substantiated 24-hour urine specimens (perhaps consecutive) are necessary.” Kempner restricted fluids to avoid water intoxication (hyponatremia as obviated by the flame photometer), showed that on the diet the patients became insulin sensitive, demonstrated that the diet lowered serum cholesterol, and provided efficacy in renal disease–inducing salt-retention states (nephrotic syndrome), and the triumph was for malignant hypertension.

Stead pointed out that Kempner did not appeal to the scientific community. The community wanted evidence-based trials. Kempner argued that the prior state was the

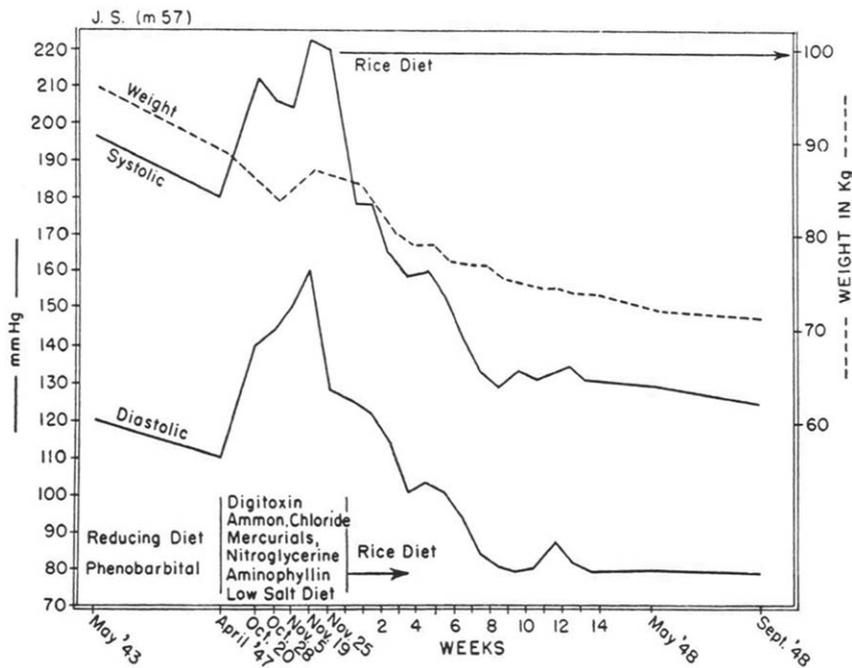


Figure 2. Shown is not the same patient as in Figure 1. We selected this example because it exemplifies on the graph to what the patients were subjected pharmacologically. The patient evidently had pulmonary edema because a strategy well known to the authors was applied.¹⁵

comparator rather than a randomized control group. Of course, the control group in Kempner's day had a survival expectancy estimated at 6 months. Kempner believed in maximal therapy; "drag it out by the roots." Did Kempner present his best data? We certainly hope so, exactly as clinician/scientists today roll out their best Western blots in any paper (who would do less?). Only 2 options exist, stated Gordon et al,¹⁹ who inspected the efficacy of parachute use in those jumping from airplanes. They dared to raise the hypothesis that perhaps parachutes are worthless—"where are the necessary randomized-controlled results?" Their first suggestion is that we accept under exceptional circumstances the notion that common sense might be applied when considering the potential risks and benefits of interventions. The second criterion is that we continue our quest for the holy grails of exclusively evidence-based interventions and preclude parachute use outside the context of a properly conducted trial, foregoing common sense. (You figure it out!) The dependency we have created in our population may make recruitment of the unenlightened masses to such a trial difficult. If so, the authors are assured that "those who advocate evidence-based medicine and criticize use of interventions that lack an evidence base will not hesitate to demonstrate their commitment by volunteering for a double blind, randomized, placebo-controlled, crossover trial."

Kempner's career was not beyond critique. Kempner received the 1975 (forerunner) Excellence in Hypertension Research Award, along with Lewis Dahl and James O. Davis, although his anecdotal case reports²⁰ cannot really compare with the output of these 2 excellent physiologists.^{21,22} Kempner never attended the Annual Council for High Blood Pressure meetings after 1975, in the authors' memories. He never consulted with Homer Smith²³ or Carl Gottschalk,²⁴ the latter a mere 15 miles away, about renal physiology. Had he done so, he might have pre-empted Bricker's trade-off hypothesis,²⁵ predicted the intact nephron

hypothesis,²⁶ or discovered infradian rhythms in sodium balance.²⁷ In contrast to his staunch supporter, Eugene Stead, he did not leave a legend or a legacy of followers inhabiting chairmanships in academic medicine.²⁸ As a matter of fact, mentorship does not seem to have been a strong point, although he was guided by several superb mentors. Not all Duke house staff physicians remember Kempner with favor. When one of his rice diet patients had to be resuscitated after developing urosepsis and shock, Kempner threw a fit when the patient was given volume expansion with normal saline (David G. Harrison, MD, personal communication, June 2014). We have no data on Kempner's grant support, although his celebrity patients probably generated income for Duke University Hospital.

Perspectives

Clearly, Kempner was provocative, from his personality, his background, and his data. Current evidence-based requirements are not fulfilled, but doubters could eschew parachutes.¹⁹ Are more marginal dietary salt reductions helpful? A correspondence between Kempner and Volhard does not inspire confidence. We are looking for advances that are slow. So what caused Kempner to swim against the stream? The stream currently requires a highly confined method of thought for research support where the final idea must be supported before the end results are known. Finally, what was the driving force in the method of thought behind Walter Kempner that caused him to swim against the stream? There was an unfulfilled idealism in his character, perhaps dating back to mysticism and Stefan George. Possibly, a return to the roots is indicated. The ideas outlined by Firestein regarding how ignorance drives science may help us here.²⁹ Nonetheless, the missed opportunities and failure to capitalize on the data in an organized and collaborative fashion mark Kempner. Stubbornness is both a helpful and a harmful attribute in scientific discovery.

Acknowledgment

None of us worked with Walter Kempner personally, although we all suffered under tachycardia at Grand Rounds presentation to Eugene Stead.⁶ This brief commentary would not have been possible without access to Barbara Newborg's delightful book on Walter Kempner and the Rice Diet.⁴ Kempner's articles have been republished, edited by Newborg, in 2002.³⁰ Since submission of this report, we are aware of an editorial that has been published on the activities of Walter Kempner, focused on obesity.³¹

Disclosures

None.

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