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## INTRODUCTION TO SIX SHORT PAPERS ON THE PRESENT STATUS OF CLINICAL HEMODIALYSIS

WILLEM J. KOLFF, M.D.

*Department of Artificial Organs, and Division of Research*

**B**OTH gradual improvements and sudden innovations have enhanced the usefulness of the artificial kidney in the treatment of uremia; this is true both for acute and for chronic renal failure.

Patients who are very sick, very young, or very old, can now be treated with dialysis and ultrafiltration.

The danger of hemorrhage is no longer a contraindication, since it is possible to heparinize the blood in the machine without prolonging the clotting time of the patient's blood.

Growing experience in the treatment of barbiturate poisoning makes dialysis preferable over conservative management in all really serious cases.

The application of very frequent, daily, or even continuous dialysis makes it possible to reduce levels of urea, creatinine, uric acid, and other retention products to normal or nearly normal levels. This technic relieves the symptoms of uremia such as nausea, vomiting, and twitching, and helps to avoid many of the complications that were formerly expected in patients in renal failure. Most important, this intensive dialysis seems to reduce the chance of infection, particularly of bronchopneumonia.

Large amounts of water can be removed by the artificial kidneys by ultrafiltration. Among the most dramatic clinical results of dialysis are the effects of ultrafiltration upon the dyspnea and cyanosis of patients with pulmonary edema. In our experience a 90-minute dialysis plus ultrafiltration has never failed to improve the clinical symptoms of pulmonary edema, although the patchy design

may still be evident on roentgenograms of the chest. A patient with intractable cardiac edema can be treated with dialysis and ultrafiltration and, after an initial improvement, may respond to diuretics to which he had previously been refractory. Ascitic fluid has been desalted and concentrated by ultrafiltration and dialysis in the artificial kidney. After intravenous administration of the concentrate, a so-called stabilization of ascitic formation was observed so that no further paracenteses were required.

The artificial kidney has been combined with artificial hibernation or refrigeration in patients who were not only uremic, but also hyperpyrexia, and in patients who were failing so rapidly that refrigeration seemed to be the only possibility of halting a progressively disastrous course.

The simultaneous treatment of two patients on one commercially available twin-coil kidney has greatly reduced the cost and number of personnel needed for operation of the machine.

Finally, technical advances are coming into sight for the making of new artificial kidneys. Heat-scalable dialyzing membranes will revolutionize the design of present dialyzers. Exchange resins may even make them obsolete.

Until recently, the artificial kidney was used mainly for patients in acute renal failure. The work of Dr. Belding H. Scribner and his associates<sup>1</sup> has opened the field for the treatment of patients in chronic renal failure. Periodic reductions of retention products, and normalization of serum electrolyte and water balance in these patients are possible by continuous dialysis for 24 hours once every five days. This entirely new approach not only prolongs life and makes it comfortable, but, it is hoped, will keep the patients in a condition good enough to be usefully employed.

This review comes at an opportune time since a generous grant from The Hartford Foundation enables the artificial kidney team at the Cleveland Clinic to explore further the potentials of intermittent dialysis for patients in chronic renal failure.

#### Reference

1. Scribner, B. H.; Caner, J. E. Z.; Buri, R., and Quinton, W.: Technique of continuous hemodialysis. *Tr. Am. Soc. Artif. Int. Org.* 6: 88-103, 1960.