HEMOFILTRATION

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Hemofiltration, pioneered by LW Henderson in 1967 (1), is one of the techniques in Nephrology which is employed alone or as an adjunct to hemodialysis for the purpose of fluid removal. It can also be used for the removal of uraemic or other toxic solutes in which case the plasma ultrafiltrate must be replaced by normal saline instead of Hartman's solution.

Hemofiltration effects removal of water and its contained solutes by means of convective transfer along a pressure gradient (2) whereas in hemodialysis, solute transfer occurs as a result of diffusion down a concentration gradient. In contrast to hemodialysis, a dialysis machine is not required for hemofiltration. The equipment for hemofiltration consists of an extracorporeal blood circulation where blood is usually let out by means of femoral catheters or an arterio-venous shunt, a hemofilter containing the filtration membrane, a system for infusing replacement solution and a receptacle for the filtrate. Heparin is given to prevent clotting in the hemofilter.

There are two ways of using hemofiltration. Firstly, Intermittent Hemofiltration, where 40 to 50% of body weight is exchanged in each thrice weekly hemofiltration session in patients who have end stage renal failure. This will rid the body of small molecular weight uraemic metabolites like urea, inorganic phosphates and potassium as well as middle molecules. Fluid removal can also be effected with fewer symptoms and less hypotension than with hemodialysis. This treatment is therefore useful for patients with unstable cardiovascular system or hypotension.

Secondly, hemofiltration can also be employed as continuous arterio-venous hemofiltration (CAVH) (3). Patients with acute renal failure with fluid overload, an unstable cardiovascular system or hypotension can be treated by CAVH for days. Filtration rates of 5 to 10 ml/min are commonly employed. CAVH is usually performed on patients in intensive care units. It provides continuous correction of both volume and composition of extracellular fluid. At the Singapore General Hospital, CAVH is presently employed for patients with acute renal failure who have unstable circulation or severe hypotension, the commonest group of patients being post cardiac surgery patients.

In this issue of the journal, ... et al from Hong Kong reported their experience with 15 patients treated with CAVH. Thirteen patients had acute renal failure and 2 had acute on chronic renal failure. Seven of the 15 patients needed vasopressors to maintain blood pressure and 5 needed ventilatory support.

In these patients vascular instability and hypotension precluded effective hemodialysis, and peritoneal dialysis was contraindicated because of recent abdominal surgery. The data showed adequate fluid removal and improvement of biochemistry. There were no hazards and the patients enjoyed good nutrition. Twelve out of 15 (80%) patients eventually recovered renal function.

CAVH is useful in the critically ill patient with acute renal failure with unstable hemodynamics. In such instances, CAVH should be the treatment of choice with a switchover to hemodialysis when the patient becomes more stable hemodynamically.

REFERENCE

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