

Equipment Commonly Used in Veterinary Renal Replacement Therapy

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- Continuous renal replacement therapy

INTERMITTENT HEMODIALYSIS MACHINES

There are several basic types of dialysis machines. In general, dialysis machines are designed to be used either for intermittent hemodialysis (IHD) or for continuous renal replacement therapy (CRRT), although “hybrid” machines, which are able to perform both types of therapies, have recently become available. Intermittent hemodialysis machines can be also used to provide sustained low-efficiency dialysis (SLED) treatments in addition to highly efficient intermittent treatments. Specific details of operation vary among machines (eg, minimum and maximum ranges for blood or dialysate flow and dialysate component concentrations); general ranges of commonly available machines are listed and illustrated here.

In the United States, most veterinary units performing intermittent hemodialysis use either Gambro (Phoenix or CentrySystem 3 models) (**Figs. 1** and **2**) or Fresenius machines (**Fig. 3**). The Gambro machines have a cartridge system for the extracorporeal circuit that includes all of the necessary tubing. The dialyzer is separate. The snap-in cartridge simplifies machine set-up, but limits tubing choices. The Fresenius machines incorporate several tubing components that are selected separately during machine set-up. This arrangement provides more flexibility with tubing size, volume, and manufacturers, but lacks the simplicity of the Gambro cartridge. There are several other types of dialysis machines that are approved for use in Europe or Canada but not in the United States. Many of these machines have the capability of on-line

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Fig. 1. Gambro Phoenix Intermittent Hemodialysis machine.

hemodiafiltration, which means they can provide large volumes of solutions to infuse into the patient as replacement fluid, in addition to producing large volumes of dialysate.

Regardless of the model or manufacturer, all modern IHD machines have certain common characteristics. First, they all contain a display screen, which may be a touch screen on newer models. This screen displays the current dialysis treatment mode, all options available in that mode, treatment parameters, alarm conditions, and any necessary instructions. During the dialysis treatment, the screen also displays treatment status (ie, time left, amount of fluid removed, catheter pressures, and so forth).

IHD machines house a dialysate proportioning system. This system takes incoming purified water and mixes it with the appropriate amount of electrolyte and bicarbonate concentrates to create dialysate at a rate of 300 to 800 mL/min. The electrolyte solution is a highly concentrated salt solution containing sodium, chloride, glucose, and other components as desired (potassium, calcium, magnesium). The machine operator sets the desired sodium concentration of the dialysate (within the limits of the

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