Letters to the Editor

A New Machine for Organ Perfusion

To the Editor:

Good organ preservation techniques are essential for an effective transplantation program. Two types of hypothermic preservation systems are used for clinical organ preservation: storage and perfusion. The pulsatile system, such as the Mox-100 and the Belzer, is the one most frequently used. The nonpulsatile perfusion system is typified by the Gambro.

Since there is some evidence to indicate that continuous hypothermic pulsatile perfusion can cause injury in the preserved organ, other methods of perfusion should be considered as alternatives for preservation. Therefore, we have devised a new system for organ perfusion that basically consists of a nonpulsatile pump, refrigeration unit, membrane oxygenator, and a dual functional support apparatus for portable or stationary use (Figures 1 and 2).

This new system was designed to meet all preservation needs. Like the other systems, it provides hypothermia and oxygenation. In contrast to the Mox-100 system, this machine is nonpulsatile, considerably smaller, easier to transport, less expensive, and supplied with a support apparatus for either portable or stationary use. It has the same characteristics as the Gambro machine, except for a different type of nonpulsatile perfusion pump.

This system has been tested extensively in our laboratory. Forty canine kidneys were perfused for 24-48 hours with cryoprecipitated plasma, with excellent results. It was demonstrated that this machine adequately supports kidney viability for 48 hours with immediate, life-supporting renal function after transplantation. Normal renal function was achieved in the second postoperative day and continued throughout the follow-up period of 20 days.

This combined transport and stationary system offers a reliable method for kidney preservation. It is compact, self-contained, easy to handle, and has fewer potentially harmful effects than the pulsatile systems.

Luis H. Toledo-Pereyra, MD, PhD
Department of Surgery
Section of Transplantation and
Surgical Research
Henry Ford Hospital

Fig. 1
Stationary and portable machine (TP-1) for organ perfusion. It provides a system with nonpulsatile pump, gas source for O₂, CO₂, air, and constant refrigeration. The flow is controlled by the nonpulsatile pump. pH is maintained by modification of O₂ and CO₂ flow rates.
Fig. 2
Schematic representation of the portable or transport system (TP-1). The cassette and the nonpulsatile pump units are maintained together for transportation purposes. A battery keeps the system working.

Acknowledgments
The ideas and assistance of Gerald H. McKenzie from our laboratories were important in the development of this work.

This work was supported by a Henry Ford Hospital Institutional Grant, No. 730-0786, from the Ford Foundation.

References