A SYSTEM FOR ARTERIAL AND VENOUS PRESSURE CALIBRATION AND RECORDING

BY

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The recording of direct arterial and venous pressures is now so well established that it has become almost a necessity during many operations and for many patients in intensive care areas.

The following conditions are required in such a recording system:

1. Complete sterility must be maintained.
2. All the connecting tubes and the pressure transducers must be filled with liquid before they are attached to the patient.
3. Intermittent flushing of the tubes must be possible, preferably by syringe, without danger to the transducer.
4. Calibration by the application of known pressures to the transducers must be possible without having to disconnect the tubing from the patient.
5. The system must be simple and easy to use.

All these requirements except the last, are met by using a calibrating stand on which the transducers are mounted. Three-way taps (metal or disposable plastic) are attached to the transducers to allow the circuit to be switched to the particular requirement. However, this means that it is necessary to use a large number of taps each of which has three positions and unless the user is entirely familiar with the arrangement mistakes can be made.

Recently an apparatus was described for exchange transfusion in neonates (Rossiter, 1962). It incorporates cam-switches which either compress or release plastic tubes, so allowing positive closure or free communication with a simple movement of the lever attached to the cam. The tubing is compressed when the lever is horizontal and released when the lever is vertical. We have incorporated these cam-switches in an apparatus to provide all the requirements for calibration and flushing and for recording simultaneous direct arterial and venous pressures.

The apparatus consists of eight cam-switches (fig. 1). However, since they are all clearly labelled, by number and by colour, there is no difficulty in choosing the appropriate circuit. The plastic tubing (fig. 2) required is supplied as a complete disposable set and is easily placed in position by removing the cams.

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Plastic disposable taps are still used on one of the entry ports of each transducer to enable the transducer to be filled. Calibration pressures can be applied to the arterial pressure transducer by an appropriate system. However, the use of a Fenwall bag and a collapsible drip-chamber remove the risk of air embolism; for greater accuracy the aneroid manometer on the Fenwall bag can be replaced by a mercury sphygmomanometer. Calibration of the venous pressure transducer is carried out by adjusting the height of an open-ended reservoir, and reading the height of water in the U-tube on a fixed scale. This reservoir is an integral part of the plastic tubing set.

Figure 3 shows the transducers and cam-switches with the disposable plastic set of tubing mounted on an adjustable stand, which also holds the mercury manometer and the venous pressure calibrating scale.

Each cam-switch has a coloured number, the four arterial ones red, and the four venous ones blue. Full instructions are engraved on the platform on which the switches are mounted. In use the cam-switches are held closed, except for those opened according to the instructions. The surface of the cam should be lubricated lightly before use.

The set of cam-switches and the complete stand are manufactured by the Biker Engineering Company Ltd, 8 West Street, Hastings. The tubing set is supplied pre-packed and sterile by Messrs Portex Ltd, Hythe, Kent. Both firms co-operated freely in the development of the apparatus.

REFERENCE