A STUDY OF EQUIPMENT FOR AND PERFORMANCE OF EXTRACORPOREAL CIRCULATION

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Extracorporeal Circulation (ECC), and for that matter, the type of equipment employed and its performance play a central role in any study designed to assess neurological and psychological reactions to cardiac surgery. Accordingly, the data-collecting questionnaires used contain a great many complex questions, of which just the cardinal points will be discussed. The aim of this presentation is to provide information and a general survey for better orientation and critical appraisal of the actual results of this international multicenter study. The patient sample is the same just mentioned in the chapter by Prof. Birnbaum - 498 cases from seven centers.

Equipment for the ECC

The central item of the ECC is the oxygenator. Two different types of oxygenators were used in the study: Bubble and membrane oxygenators. In 225 operations, i.e. in 46%, bubble oxygenators were used, and in 273 operations (54%), membrane oxygenators were employed. The membrane group included a few more membrane-sheet than hollow-fibre oxygenators (29% vs. 24%). Only 2% were membrane-silicone oxygenators. The protocol of the study did not stipulate the number of bubble or membrane oxygenators to be used. The fact that bubblers were used in nearly half the cases indicates that not all cardiac surgeons were convinced of the superiority of membrane
oxygenators, although the advantages of the membranes are emphasized in the literature.

Eight different models of bubble oxygenators from seven manufacturers were included in this study. The use of individual models varies between 2 and 28% of the total of 225 bubblers. The differing numbers for the individual models reflect differences in the number of operations in the respective centers and do not necessarily show that a particular oxygenator is favored. With regard to differences in the quality of bubble oxygenators, there is a wide range of opinions.

Membrane oxygenators were employed in only four of the seven centers. Four different models of membrane-sheet oxygenators were used in a total of 144 cases and three models of hollow-fibre oxygenators in 120 cases. The silicone-membrane oxygenator was hardly used at all (9 cases). Two models were employed in two centers exclusively. The other five models were distributed among the other two centers. Just as with the bubble oxygenators, the number of individual models of membrane oxygenators employed does not reflect quality or superiority. Practical criteria, such as rapid and safe handling or service of the supplying companies rather than criteria, such as complement activating properties or permeability for gas bubbles, seem to guide the choice of a particular oxygenator in a given center. This is because our knowledge of quality of this device is not yet good enough.

Table 1 depicts the types of oxygenators used by the individual centers. Three of the seven centers used

Table 1. Proportion of oxygenator type per center.