

BOOK REVIEW

Mechanical Support of the Failing Heart and Lungs

Edited by David Bregman, M.D., Appleton-Century-Crofts/New York, 1977. 29 contributors, 7 chapters, 210 pages, 53 figures, 31 tables and 194 references, \$15.00

Mechanical Support of the Failing Heart and Lungs is a collection of papers presented at a conference on June 5, 1976 of the same title and supported in most parts by grants from the National Heart and Lung Institute. The book represents a summary of the recent developments presented by some of the most published authorities in the following aspects of mechanical pulmonary and cardiac support.

- A. Pulsatile cardiopulmonary bypass by G. Papas.
- B. Unidirectional intra-aortic balloon pumping (I.A.B.P.) and counterpulsation during open heart (O.H.) surgery by D. Breezman with help from S. Haubert.
- C. Management of low cardiac output after open intracardiac operation with a left heart assist device (L.H.A.D.) by R. Litwak.
- D. An intracorporeal abdominal left ventricular assist device (A.L.V.A.D.) by J. C. Norman.
- E. Background and technical aspects of membrane oxygenation (M.O.) by P. M. Galletti.
- F. Extracorporeal membrane oxygenation (E.C.M.O.) for acute respiratory insufficiency (A.R.I.); Current status by E. C. Pierce, II.
- G. Clinical experience with E.C.M.O.; Future needs by J. D. Hill.

Within most chapters there is a great deal of redundancy with previously presented articles.¹⁻¹⁴ However, for the reader unable to keep abreast of the literature on mechanical cardiac assist (M.C.A.) or E.C.M.O., Bregman's collection is a near complete review of the available and soon to be available clinical techniques. Only three techniques of a myriad for creating pulsatile flow during E.C.C. are presented in the collection and the I.A.B.P. and the pulsatile assist device, the only counterpulsation techniques discussed. The concept of A.L.V.A.D. presents a technique to assure almost every patient a "physiological" separation from cardiopulmonary bypass, although, the included consent form that must be signed is enough to cause angina alone.

Galletti's historical treatment of the basic concepts, design, material and manufacturing considerations in M.O. is refreshingly unique and enlightening, especially when contrasted with Norman's, Pappas', Hill's, Litwak's and Bregman's chapters which contents have had numerous previous exposures.^{1-8, 10-14}

Galletti points out in his chapter on the background and technical aspects of M.O. that it takes approximately 20 years for a device to make it from the lab to daily clinical usage. Galletti discusses the encounter of basic science, technology and industry that made M.O. today's clinical reality. (Norman's chapter on the A.L.V.A.D. further elucidates the success of the marriage of engineering technologies and medical needs.)

The average clinician-perfusionist may not be called upon to participate in the clinical application of any of the mentioned devices or even care to be involved. For the technologists that desires to step outside of the binding job description of "operating the E.C.C. during O.H. surgery," there are several ways to prepare for new clinical techniques and devices. In the years that future clinical devices are being developed in the lab and the manufacturing processes are refined, the work is appearing in periodicals such as the transactions of the American Society of Artificial Internal Organs (A.S.A.I.O.),^{4,7} Medical Instrumentation⁶ and Annual Conferences on Engineering in Medicine and Biology.⁸ Future devices are the result of a multidisciplinary approach to meeting patient needs. The primary education of future perfusionists and the continuing education and thrust of our professional organization should reflect the multidiscipline involvement if perfusionists are to be responsible for the application of new M.C.A. and E.C.M.O. devices.

Pierce's and Hill's chapters should be contrasted with an article by Lefrak et al,⁹ on the present status of E.C.M.O. in 1973. Four years experience with E.C.M.O. for A.R.I. has demonstrated two major problems; 1) a membrane surface coagulopathy and 2) the necessity for close heparin control and the care of attendant bleeding problems. Logistic concerns in patient selection and predicting lung disease reversibility and the efficacy of E.C.M.O. are paramount.

In summary, a great deal of content is spent reporting patient results and mortality, however, the techniques are reported in much more detail than in *Current Techniques in Extracorporeal Circulation* and hence are easily reproduced. Each of the two group discussions is plagued with generalities, constantly changing topic and often unanswered questions with panel members avoiding quantification and specific fact statement. For the perfusionist not familiar with literature on M.C.A. and E.C.M.O. Bregman's collection will be educational and exciting reading.

Jeffrey B. Riley C.C.T., C.C.P.
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