In Vivo

Correspondence from
Our Readers

Dear Sir:

We at St. Joseph’s Hospital, Milwaukee, Wisconsin, are desirous of obtaining a second man to participate in running the Sarns pump during cardiovascular surgery. At the present time we have been working approximately one year at St. Joseph’s Hospital, although elsewhere prior to that time. Our work load is low, but building. Our present technician anticipates going into private business in approximately one year, and, accordingly, the man we are seeking must have the ability to function independently.

Sincerely yours,
Raymond R. Watson, M.D.
2266 North Prospect Avenue
Milwaukee, Wisconsin 53202
Telephone 273-7553

Dear Sir:

I read your Journal editorial (Fall 1970) concerning the goals of AmSect with regard to ‘Intrasociety’ communication with great interest. Since we are also presently in the process of establishing guidelines and recommendations for existing and future programs of Cardiopulmonary Technology and a national registry, I feel we must be facing the same challenges and problems.

Because the background knowledge and responsibilities of our members overlap a great deal (I happen to be a pump tech), it would seem a great waste of facilities, ideas, and educators to duplicate all our efforts along the lines of core curriculum and technical experience.

I enjoy your Journal very much and look forward to attending at least part of your next Annual Meeting to be held in the Midwest.

Sincerely,
Leslie Katzman R.N. C.V.T.
Member, National Education Committee
National Society of Cardiopulmonary Technologists
Methodist Hospital of Madison

A. H. A. Special Reports

Highlights of the 1970 Scientific Sessions in Atlantic City

Medical Team Reports New Success In Repairing “Blue Baby” Defect

Dr. Welton M. Gersony attributed the team’s success to refined surgical techniques and improved medical management.

The surgery requires the use of a specially modified heart-lung machine which takes over the job of pumping blood to the body, leaving surgeons free to operate on a bloodless heart.

The operation requires one to two hours, said Dr. Gersony, and involves reconnecting the pulmonary veins to the left atrium and closing the hole between the two upper chambers.

The surgeons also made sure to create a very large orifice where the pulmonary vein and left atrium were reconnected. This was to guarantee adequate blood drainage from the lungs back to the heart, so that there would be no more lung congestion. They also buffered blood during surgery so as to maintain careful balance of the delicate acid-base levels.

And following surgery, all infants were routinely maintained with artificial respiratory support for 12 to 36 hours to keep the now-clear lungs from getting tired. Furthermore, intravenous fluids were kept to a minimum to allow the re-connection to take hold and, again, to avoid congestion.
New Role Seen For Old Substances
In Treating Cardiovascular Disorders

The substances, members of a family of compounds called prostaglandins, have been known since the 1930's but their potent effects on the cardiovascular system, including stepped-up heart pumping power and reduced blood pressure, were observed only recently. Because of these actions, the prostaglandins show promise in treating shock, high blood pressure, heart failure and maybe even coronary artery disease, which is a forerunner of heart attacks.

Of the 14 prostaglandins identified, 13 are found in man. Generally, they are classified into three main categories, PGE, A and F, with sub-units in each group (e.g. PGA1, PGA2). While their exact functions in the body are still open to some questions, they are believed to be regulating agents that stimulate or inhibit the action of many hormones. The latter are chemical messengers secreted by glands into the bloodstream to help regulate the functions of cells and organs.

One report by Drs. Colin M. Bloor and Burton E. Sobel of the University of California School of Medicine in San Diego, described tests in which PGE and PGA, when delivered directly into the heart through a catheter, brought about a quick reduction in blood pressure while increasing the blood and oxygen supply to the coronary arteries nourishing the heart. But compounds in the PGE family had no effect.

(The PGF’s, however, are effective in inducing labor and for therapeutic abortion because of their profound ability to cause the uterus to contract.)

In another paper, Dr. Donald O. Nutter and Harold Crumly of Emory University School of Medicine in Atlanta, reported studying the effect of PGE1 and PGA1 by injecting them directly into the coronary arteries of anesthetized dogs. Both increased the heart’s contraction force and dilated the coronary vessels. But PGE1 proved to be a more potent dilator. The dilator effect was shown not to be related to the coronary force increase, but to a direct action of PGE1 on the vessel.

Still another group from the San Diego medical center—Drs. Charles Higgins, Stephen Vatner, Dean Franklin and Eugene Braunwald—expressed the view that the PGA compounds were probably the most promising of the lot in the treatment of cardiovascular diseases, since they act almost exclusively on the heart and blood vessels. This selective activity suggests that their use in treatment would not be limited by undesirable side effects resulting from action on other organs.

Dr. Higgins and his colleagues also said that unlike other prostaglandins, the PGA group is able to pass through the lungs without being broken down and losing potency. This means that the compounds could be administered intravenously and still get carried by the circulating intravenously and still get carried by the circulation to the target centers. The others, the E group, would have to be introduced directly into the heart.

In their trials, Dr. Higgins and his associates gave dogs small doses of PGA1 intravenously and promptly brought about a reduction in blood pressure, while increasing the amount of blood and oxygen flowing to the heart muscle and raising by almost 50 percent the amount of blood pumped into the general circulation with each heart beat. The agent also increased blood flow to the skeletal muscles, the kidneys and intestines.

The multiplicity of effects is what has scientists optimistic about the broad spectrum of disorders which the prostaglandins may be called upon to check. In the case of PGA1, for example, its ability to increase the output of blood from the heart and step up the flow to other critical organs may make it a useful antidote to shock. The capacity to lower blood pressure (by expanding the arteries so that blood has an easier time of getting through the flow channels) suggests its application to the control of high blood pressure.

By increasing the pumping capacity of the heart, it may work to offset heart failure, in which the heart fails to develop sufficient power to maintain an adequate circulation. Furthermore, PGA1 does not produce heart irritability and abnormal cardiac rhythms sometimes seen with other agents used for heart failure, therefore making it a potentially safer drug.

Finally, the dramatic increase in blood and oxygen flow through the coronary arteries may make PGA1 potentially applicable to the treatment of coronary artery disease brought on by a narrowing of the pipeline through the accumulation of fats on the inner vessel walls.

Failure Of Artificial Heart Valves
Traced To Uptake Of Fats In Blood

The infiltration of fats (lipids) from the circulation is now widely held to be a major cause of those injurious changes which occur in silicone rubber valves, according to Dr. H. P. Chin, spokesman for the collaborating scientists from the University of California School of Medicine, Los Angeles, and the Jet Propulsion Laboratory, Pasadena. These physical changes, developing months or years after implantation and known as variance, include discoloration, swelling or shrinking, leaking and cracking.

Nor is variance the only cause for concern. Studies by the California scientists of mechanical valves recovered at autopsy or at replacement surgery indicated that a signif-
A significant number may be laced with uncured silicone polymers—plastic strands that were not fully treated in the manufacturing process. Mixed with absorbed blood fats, these free polymers are potentially available for release into the bloodstream. There, Dr. Chin said, they may adversely affect a number of biological functions.

The studies also showed that, contrary to what has been widely assumed, only selected blood fats infiltrated the plastic material. The differences may be due in part to variations in the valve manufacturing processes, or to individual variation among patients.

Vocational Outlook Bright
After Major Heart Surgery

Dr. R. Newell Finchum of the University of Alabama Medical Center said that 92 of 111 patients (83 percent) involved in a surgical follow-up study had gone back to jobs. And 64 of the 92 had achieved or were in process of reaching their pre-surgery work goals.

Death Causes Re-evaluated
In Heart Valve Replacement

A newly-recognized form of heart attack has become the single most common cause in cases of early death following heart valve replacement surgery.

Drs. Nicholas D. Colapinto and Malcolm D. Silver said the cause of the disorder—called multifocal myocardial necrosis—is unknown, but it seems to be related to the length of operative procedure, especially the time spent on the heart-lung machine. The victims show widely scattered zones of dead heart muscle tissue.

Not only does the incidence of this malady appear to be rising, but the disorder also has come into prominence as medical specialists have learned to reduce fatalities from other causes. Such strides have been made in surgical technique and post-operative care in the last decade that the immediate post-operative survival rate is now generally greater than 90 percent.

The Canadian scientists assessed the causes of death among the 666 patients operated on for artificial valve replacement between 1962 and 1969 at Toronto General Hospital. Of those who died early—within 30 days of surgery—only 99 had been autopsied and, hence, included in the study.

Of these, 35 had had heart attacks, but of two different types. Only 10 were found to have suffered typical heart attacks, characterized by the death of one area of the heart muscle and indicative of a failure on the part of one of the coronary vessels supplying the heart to deliver enough oxygen to that specific region. The other 25, however, were observed to have multifocal myocardial necrosis—the widely scattered zones of dead heart muscle tissue.

Other causes of early death included hemorrhage (10 patients), mechanical valve breakdown (9), stroke (8), residual heart abnormalities (8), blood vessel blowouts or aneurysms (3) and respiratory complications (3). In the other patients, where no specific fault was identified, deaths were attributed to heart failure or “sudden death.”