



UNIVERSITY OF MINNESOTA
TWIN CITIES

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School of Public Health
Stadium Gate 27
Minneapolis, Minnesota 55455

June 4, 1974

De Blackburn

Mr. Jerry Prettyman
Burdick Corporation
12026 Riverwood Drive
Burnsville, Minnesota 55337

pc. G. Rainer

Dear Mr. Prettyman:

In using the Burdick DC/160 defibrillator in experimental work on dogs, I have discovered certain characteristics of this defibrillator which I feel should be brought to your attention. In some initial experimental work I performed, I produced ventricular fibrillation in three different closed-chest dogs which had been anesthetized with sodium pentobarbital (25.5 mg/kg i.v.). This fibrillation was induced by a single rectilinear pulse of 10 msec. duration and approximately 20 ma intensity delivered to the ventricular myocardium by means of permanently implanted bipolar platinum-iridium pacemaker electrodes (Medtronic). Fibrillation can be induced by such a pulse if it is delivered during the "vulnerable" period of the cardiac cycle. Each of the three dogs used was a normal healthy mongrel with a body weight of from 50 to 60 pounds.

Following induction of ventricular fibrillation, resuscitation was attempted immediately (within 10 to 20 seconds) by means of transthoracic countershock applied to the thorax from which the hair had been clipped and to which electrode paste had been liberally applied. In this initial work with these dogs the defibrillation output power (meter reading) was set at from 150 to 250 watt sec. With this setting defibrillation was achieved only after several attempts (on the order of 8 or 9) at countershock. My past experience using another make of DC defibrillator indicated that this difficulty in resuscitation was not a usual occurrence. Hence, the DC/160 was tested by discharging it into dummy loads of varying resistances at a variety of power outputs. In each case the output waveform was monitored on an oscilloscope.

The results of this testing indicate that as the external resistive load and/or the power output of the DC/160 are increased, the negative overshoot of the output pulse acquires a considerable magnitude. Stratbucker et al.* have indicated that these second oscillatory waves or overshoots may be highly pro-fibrillatory if they are in the range of 10 to 30 watt sec. With power outputs on the order of 150 watt sec. or larger and loads of 50 ohms or larger, the DC/160 second oscillatory (i.e., overshoot) wave is definitely in this pro-fibrillatory range.

With this in mind, I retested the DC/160 on the same 3 dogs using larger lead electrodes (14x12 cm.) to reduce transthoracic resistance and with power outputs in the range of 50 to 100 watt sec. This procedure resulted in successful

*Stratbucker, R.A., Chambers, W., and Hagan, W. Defibrillator Performance Characteristics. J. Assoc. Advan. Med. Instr. 5: 149, 1971

Mr. Jerry Prettyman

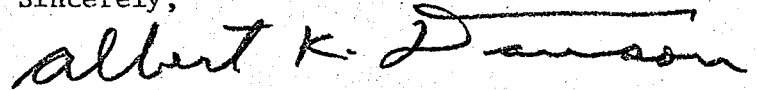
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resuscitation following 1 or 2 countershocks. Again, working with these same 3 dogs and the 14x12 cm. lead electrodes, but now increasing the DC/160 output to 150 watt sec., defibrillation was never achieved with as many as 3 countershocks; only when the output power was dropped below 100 watt sec. was defibrillation readily achieved.

I have discussed this matter with the director of our laboratory, Henry Blackburn, M.D., as well as with Richard Crow, M.D., a cardiologist on our laboratory staff. The great danger as we see it in this malfunction of the DC/160 is in its use with human patients. Most cardiologists, we believe, will have a tendency to use the defibrillator on a high output power. This may result in an inadvertent failure by the operator to resuscitate the victim. We believe this matter to be of a MOST SERIOUS nature and to warrant your IMMEDIATE attention.

Sincerely,



Albert K. Dawson, Ph.D.

cc: Dr. Henry Blackburn
Dr. Richard Crow