(2) preventing the mattress from sliding on
the table:
(1) Placing the patient in the Trendelen-
burg position is simple, but must be done
precisely and in advance. (a) The patient
is placed so that the creases at the back of
the knees are about 3 to 4 inches below
(toward the foot) the line where the foot
portion of the table hinges. (b) Before
turning the table to the Trendelenburg
position, the foot of the table (from knee
to toe) is lowered. (c) The table proper is
then tilted head downward. The patient
will slide toward the head end for 1 or 2
inches until the back of the knees catches
at the break in the table. (d) When final
position has been attained, the foot portion
of the table should be depressed at the same
angle at which the rest of the table is tilted
in the opposite direction.
(2) When patients slide after being
placed in tilted positions, almost always it
is really the mattress that is slipping. Pa-
tients rarely slide on the sheet on which
they lie. Most slipping occurs between the
sheet and mattress or the mattress and the
table, especially if the rubber covering is
smooth or old. This misadventure is pre-
vented by securing the sheet and mattress
to the operating table with a few strips of
wide adhesive tape beforehand, or by re-
placing the mattress with a newer type
which does not slip as much as an old mat-
tress.
These methods have been used success-
fully without employing braces in hundreds
of cases during the past four years. It was
necessary to add shoulder braces in only two
instances of steep Trendelenburg position
for very obese patients, and in these cases
the majority of the weight was borne by the
legs and body, as already described. There
have been no instances of sore legs or
paralysis of any nerves of the legs, and the
incidence of phlebitis of the lower extremi-
ties has not increased. Either of these meth-
ods will be effective in moderate Trendelen-
burg position and if both are used, even steep
head down postures can be handled easily.

WALLACE M. SHAW, M.D.,
Prospect Heights Hospital,
Brooklyn, New York

AN ELECTRIC SHOCK APPARATUS FOR VENTRICULAR
DEFIBRILLATION

We are presenting an adaptation of a
conventional type of electric shock appara-
tus to serve as a ventricular defibrillator.
The equipment is a commercially available
"shock machine"* which was designed for
convulsive therapy by the psychiatrist. It
incorporates a variable electronic timer of
high accuracy and an efficient variable volt-
age adjustment control which make it a
suitable apparatus for defibrillation. This
apparatus as adapted has been tested and
found to deliver the electric shock necessary
for ventricular defibrillation that is, a 60
cycle alternating current with a potential of
110 volts and a current of 1 to 1.5 amperes
for one-tenth to five-tenths second.

We have had constructed two flat heart
electrodes which are 2 inches square and
made of copper heavily plated with silver.
The right angled handles are made of a
nonconducting plastic material which pro-

* Manufactured by the Electro-Physical
Laboratories, Inc., Rye, N. Y.
tects the operator from accidental leakage
of current and they provide a convenient
holding angle at which to apply the elec-
trodes to the heart. The electrodes may be
sterilized by immersion in alcohol or Bard-
Parker solution.

The only alteration which we made in the
electrical circuit itself was to install an
isolating transformer between the wall out-
let and the shock apparatus. This provides
an extra measure of protection to the pa-
tient by preventing him from getting a
"ground shock" should he accidentally be-
come connected to ground by contact with
the metal operating table or through the
leakage of blood or irrigating fluid.

Several salient physical factors are con-
cerned with the placement of the electrodes
and the choice of the current. The voltage
used should be roughly proportional to the
transverse diameter of the heart. The com-
pression applied to the heart with the elec-
trodes by the operator is an important fac-
tor since increased compression reduces the effective resistance of the heart and allows a lower density of current to be used. Since the highest resistance in the heart is the "contact resistance" at the site where the electrodes touch the heart, we have provided the electrodes with "booties" of cotton fabric which are moistened with saline solution. This insures good contact and tends to prevent burns to the myocardium.

The apparatus itself is grounded but is not sparkproof. All of the exposed electrical circuits are enclosed in a wooden case so that the possibility of explosive mixtures getting into the apparatus is extremely remote. The explosive hazard of a spark occurring at the contact site always exists. The possibility that such a spark would cause an explosion is minimized by the fact that part of any cardiac resuscitation is the halting of administration of the anesthetic agent and the washing out with oxygen. This routine procedure minimizes the explosion hazard by diluting the explosive gases below their explosive range.

The apparatus has been tested on animals and employed for human defibrillation with success. The electrical characteristics advocated are 110 A.C. voltage of one-tenth to two-tenths second.

**SUMMARY**

A method of adapting a commercially available apparatus for use as a cardiac defibrillator is presented. Changes in the mechanism and precautions for use are described.

**REFERENCES**


**PAUL KUSHNER, M.D., AND MILTON ADELMAN, M.D., Mount Sinai Hospital New York, N. Y.**

**PROBLEMS ENCOUNTERED IN ANESTHESIA FOR CARDIO-PERICARDIOPEXY**

Cardio-pericardiopexy is an operation designed to rehabilitate cardiac cripples. With this procedure an attempt is made to overcome the myocardial ischemia by establishing adequate collateral circulation as well as producing myocardial hyperemia. Talcum powder is inserted into the pericardial sac to establish adhesive pericarditis. Anesthesia for this type of surgical intervention entails the development of a regimen that can easily be managed by a badly damaged heart. Extrasystoles, circulatory collapse, ventricular and auricular fibrillations, and cardiac arrest have been encountered during operation.

Thompson and Raisbeck (1) have stated: "The selection of patients for the operation depends on the following: (1) The establishment of a positive diagnosis of coronary artery disease with angina. This may depend upon subjective findings such as a distinct and clearly defined anginal syndrome, pain of the characteristic nature and distribution with a definite relationship to effort. Or it may depend upon objective evidence of myocardial disease as revealed by electrocardiogram, although this is occasionally absent. (2) The lack of improvement after fairly prolonged medical treatment. (3) An extreme degree of disability, corresponding to at least class three of the Heart Association classification, necessitating greatly limited physical activities. "A previous coronary occlusion is not a contraindication; however, sufficient time must have elapsed to permit healing of the infarct. The two principal contraindications to the operation are congestive failure and an active infarct. An attempt is made to rule out the presence of an active process by means of serial electrocardiograms, blood sedimentation rates and white blood cell counts. These three tests are performed each day for four or five days immediately preceding the operation. If the electrocardiograms are not stable and the other two tests show an abnormal increase, the operation is postponed" (1).