

toms of recent myocardial infarction. The electrocardiograms taken within a few hours of the onset of the attack revealed striking displacement of the ST segment downward and in the opposite direction from the usual pattern. The QRS complexes were increased in voltage and lacked the characteristic Q waves. In one patient the typical pattern of anterior myocardial infarction emerged after ten hours, in another deep inversion of the terminal portion of the T waves without ST segment changes replaced the original pattern.

All patients died and postmortem examinations were performed on three. The examinations revealed recent myocardial infarction of the anterior wall of the left ventricle caused by complete closure of the descending branch of the left coronary artery in each instance. Extensive narrowing of the remaining coronary arteries was present in all, with widespread diffuse and patchy fibrosis of the left ventricular musculature in addition to the recent infarction. Subendocardial necrosis was outstanding in all.

It is concluded that the electrocardiograms demonstrated extensive subendocardial injury of the anterior wall. The endocardial injury was excessive because extensive narrowing of the vascular bed prior to the final occlusion prevented adequate collateral circulation.

The peculiar electrocardiographic pattern is a poor prognostic sign when seen during an episode of acute myocardial infarction.

EXPERIMENTAL INTERAURICULAR SEPTAL DEFECTS. *Sanford E. Leeds, M.D., William Birsner, M.D. (by invitation) and Orrin Cook, M.D. (by invitation), San Francisco, California.* (From The Harold Brunn Institute, Mount Zion Hospital.)

The production of interauricular septal defects by surgical means may become important if it could be shown that patients with severe mitral stenosis would be benefited by such a procedure. Closure of large congenital auricular septal defects would be most advantageous if an entirely satisfactory technic could be devised. For these reasons an operation which could be done with low mortality and no loss of blood, was developed for production of interauricular septal defects in dogs. After producing the defects the animals were studied with the catheter technic.

MECHANISM AND EFFICACY OF DIBENAMINE PROTECTION AGAINST SPONTANEOUS CYCLOPROPANE ARRHYTHMIAS IN SURGICAL PATIENTS. *Mark Nickerson, Ph.D. (by invitation) Hugh O. Brown, M.D., and Scott M. Smith, M.D. (by invitation), Salt Lake City, Utah.* (From the Departments of Pharmacology and Anesthesiology, University of Utah College of Medicine.)

The subjects of this study were healthy young adults undergoing elective surgery. Premedication was given with barbiturate, morphine and scopolamine. Patients were uniformly carried through all planes of surgical anesthesia to respiratory arrest and back to plane I over a period of about thirty minutes with unsupplemented cyclopropane. In plane IV and stage IV adequate oxygenation was maintained by pressure on the rebreathing bag, except for short periods during which the effects of anoxia were observed. Continuous electrocardiographic tracings, usually lead II, were obtained.

Control patients developed arrhythmias in all planes of surgical anesthesia. These irregularities increased exponentially with the depth of anesthesia. Ventricular tachycardia regularly developed in plane IV or stage IV. The arrhythmias were found to be accentuated by anoxia.

Premedication (one-half to twelve hours prior to operation) with 5 mg./Kg. of dibenamine only slightly reduced the incidence and severity of arrhythmias, but 7.5 mg./Kg. almost completely eliminated them. Such irregularities as did occur tended to increase exponentially with the depth of anesthesia as in the control series. No serious untoward reactions were noted.

Dibenamine protection against cardiac arrhythmias does not appear to be merely secondary to the effects of the drug on the peripheral circulation. The mean blood pressure in the three groups during anesthesia was not significantly different and the dose of dibenamine required to prevent cardiac arrhythmias was definitely higher than the dose (5 mg./Kg.) required to reverse the blood pressure response to epinephrine or sympathetic nerve activity in humans.

HYPERSENSITIVITY TO PENICILLIN. *J. F. Waldo, M.D. and Jeanne T. Tyson, B.A. (by invitation and introduced by M. M. Winthrope) Salt Lake City, Utah.* (From the Department of Medicine, University of Utah College of Medicine.)

In certain instances it has been possible to demonstrate by passive transfer, employing the Prausnitz-Küstner technic, a circulating antibody to penicillin. This passive transfer was possible only from those subjects with a severe reaction and then only during the most active phase of their reaction. The antigen employed for the passive transfer was crystalline penicillin dissolved in saline.

Experimental studies of penicillin sensitivity in animals are now in progress. By binding crystalline penicillin to pure human albumin we have been able to produce an antibody in rabbits which gives a fairly strong complement fixation reaction with the albumin-penicillin mixture after all reactivity to human albumin has been absorbed. Penicillin alone administered to the rabbit has failed to produce such an antibody. We also have some evidence that when penicillin is bound to human albumin the resulting antigenic product behaves in the manner of a mixed antigen while the human albumin used in the experiment behaves in the manner of a pure antigen. Quantitative studies of this antigen-antibody system are now in progress.

Inasmuch as it is known that penicillin does bind *in vivo* to albumin, it seems reasonable to suppose that when penicillin is administered to man the penicillin haptene coupled to albumin *in vivo* constitutes an antigen for the production of antibodies specific to this haptene group. This might well account for the penicillin sensitivity reactions that are observed in man.

EXCITATION OF HUMAN AURICULAR MUSCLE AND SIGNIFICANCE OF THE INTRINSICOID DEFLECTION OF THE AURICULAR ELECTROCARDIOGRAM. *Lowell A. Woodbury, Ph.D. (by invitation) and Hans H. Hecht, M.D., Salt Lake City, Utah.* (From the Departments of Physiology and Medicine, University of Utah College of Medicine.)

Electrocardiograms obtained by cardiac catheterization in man reveal a characteristic

form when the electrode is brought into contact with or closely adjacent to auricular muscle. The similarity of human records to those obtained from isolated muscle strips of lower animals is inescapable. It stimulated the re-examination of the "dipole" concept of the membrane theory of cardiac excitation and recovery.

Theoretical considerations support this concept. The wave of excitation may be viewed as a band in which the membrane is partially depolarized. The band is not sharply demarcated but shades from complete polarization on the leading edge to complete depolarization on the following edge. This is equivalent to two line charges of opposite sign the effective width of the band apart and submerged in a volume conductor. If a model is constructed or if the circles of equipotentials that arise from the two line charges are plotted and if a point representing the electrode is placed so that the moving line charges pass under or very close to the point, a diphasic curve may be constructed geometrically and expressed mathematically. The theoretical curve very closely resembles the recorded action potentials from human auricular muscle *in situ*.

Practical considerations deal with the definition and clinical application of the intrinsic deflection of Lewis which defines the moment that the band begins to pass under the electrode and the semidirect or intrinsicoid deflection of Wilson that defines a similar event for semidirect leads. It is demonstrated that with the exception of certain esophageal positions no true intrinsicoid deflection and no truly semidirect leads exist for auricular muscle in man. The impact of these considerations for the diagnosis of auricular enlargement and for the so-called pattern of mitral and pulmonic P waves will be discussed on the basis of observations obtained from detailed analysis of simultaneously recorded esophageal and precordial auricular leads.