Correspondence

Digitalis and Heart Disease

To the Editor:—In the article “Indications for Prophylactic Digitalization” (Anesthesiology 30: 648, 1969), Deutsch and Dalen recommend preoperative digitalis for all patients with any clinical or historical evidence of heart disease, and even for some without heart disease. They believe that digitalis given before operation will prevent intra- or postoperative heart failure and prevent or control postoperative arrhythmias. Were these recommendations well supported, the question would not have been published under the heading “Medical Intelligence.” We agree with the authors in that the question remains controversial and would like to present the alternative interpretation.

Data which can be brought to bear on this question, including some cited by Deutsch and Dalen, could equally well support a position that the indications for digitalis in preoperative patients are the same as for patients not anticipating anesthesia and operation. Patients who require digitalis to cope with the “mandatory increase in cardiac output in response to operation and its potential complications” are the same as those who require digitalis in order to climb steps, work in the garden, survive the fever of flu, and withstand the “multiple stresses” of marital life.

Data which are selected to apply to this question are related to one’s bias, which in turn is derived from one’s experience. To us, treatment of heart failure during or after operation is a relatively simple therapeutic challenge with a high success rate. Treatment of postoperative arrhythmias, particularly AV block or ventricular tachycardia in previously-digitalized patients who may also have hypokalemia, alkalosis or acidosis, bleeding, and respiratory insufficiency, represents an extraordinarily difficult therapeutic problem with a lower success rate. Since these arrhythmias usually respond to potassium, lidocaine, diphenhydantoin, and cessation of digitalis, we believe digitalis toxicity is a common primary or contributing cause. We prefer, therefore, the patients receive digitalis only when clearly indicated, and we prefer to treat failure rather than ventricular tachycardia in the postoperative period.

Heart failure is a rare complication of noncardiac operations. When it occurs, it is usually secondary to myocardial infarction, overtransfusion, hyperpyrexia, cerebral edema or some other unanticipated event. Even in patients with preoperative heart failure, postoperative failure is not common. It is not surprising, therefore, that no controlled study has demonstrated that prophylactic digitalis decreased the incidence of heart failure during or after operation in any group of patients under any circumstances.

As to prevention of postoperative arrhythmias, no study which purportedly demonstrated a lesser incidence of arrhythmias in patients who were digitalized before operation, had incorporated in it the essential design characteristic of random assignment of patients to treated and untreated groups. Non-random assignment of patients introduces many obvious sources of bias. Rigid criteria in patient selection and random assignment are necessary to insure that homogeneous groups are being compared. Without such a study, the value of prophylactic digitalization will remain unknown.

We disagree particularly with two recommendations relating to our area of special interest. We do not believe that all patients should be digitalized before cardiac surgery, nor that all patients with aortic and mitral stenosis should receive digitalis before noncardiac surgery.

Digitalization of all patients prior to cardiac surgery not only is unnecessary but is certain to increase the risk of digitalis toxicity after operation. Many patients with uncomplicated congenital heart defects such as tetralogy of Fallot, pulmonary stenosis, atrial or ventricular septal defects do not need digitalis before operation because they are not in failure. Many patients with mild forms of these diseases do not even need digitalis after operation. On the other hand, surgically-induced heart block, either partial or complete, is a serious and at times fatal complication of
repair of septal defects and diseased aortic valves. Digitalis given before operation increases the degree of partial block when it occurs, adding to the difficulty in maintaining an adequate heart rate with isoproterenol and to the duration of treatment. One could argue that preoperative digitalis is specifically contraindicated in patients not in heart failure about to undergo operations which may induce heart block. The authors defend their position with the statement that their treatment of postoperative arrhythmias "is the same whether or not digitalis was given preoperatively." They overlook the possibility that AV block and ventricular tachycardia might not have occurred had not digitalis been given before operation.

As for patients with mitral stenosis, we cite with pleasure the instructive study by Beiser et al. (New Eng. J. Med. 278: 131, 1968) of the effects of digitalis in patients with mitral stenosis, most of whom had normal sinus rhythm. Studying the patients before and after acute digitalization, the authors observed that digitalis decreased heart rate and increased exercise tolerance only in patients with atrial fibrillation. In patients with sinus rhythm, no change in heart rate even at intense levels of exercise was produced by digitalis, and no beneficial effect was exerted on cardiac output, oxygen consumption or pulmonary hypertension at rest or during exercise. Clearly, patients with mitral stenosis and sinus rhythm will not benefit from digitalis either before operation or when faced with the "mandatory increase in cardiac output in response to operation." As with mitral stenosis, all patients with aortic stenosis need not be digitalized before operation, since heart failure appears late in the natural course of this disease. Angina and syncope are the common manifestations and obviously will not be remedied by digitalis.

A further consideration is the dose of digitalis recommended by the authors and the narrow range between therapeutic and toxic doses which they note. The proper dose of digitalis is that which produces the desired effect short of toxic effects. There is strong suggestive evidence that a therapeutic dose may become a toxic dose when the functional state of the heart changes. Patients with atrial fibrillation on their usual maintenance doses of digitalis have developed digitalis toxicity manifested by ventricular arrhythmias, including fibrillation and death, after conversion to sinus rhythm by DC defibrillation. Similar events have occurred when the functional state of the heart was improved by a valve replacement, for example. Unless digitalis is discontinued several days before operation, digitalis toxicity is likely to develop in the immediate postoperative period. The converse is undoubtedly true, and applies to doses which "err on the side of underdigitalization" as recommended by the authors. Should the functional state of the heart worsen during or after operation (failure or atrial fibrillation), these "underdigitalization" doses will be inadequate. Should this occur, the overrated hazards of rapid intravenous digitalization will not have been avoided and the delay to peak drug effect after parenteral administration will still exist.

As a final comment, we question the therapeutic principle implied by preoperative digitalization. Even though heart failure and dangerous arrhythmias are not common complications after non-cardiac operations, Deutsch and Dalen recommend that large numbers of patients be given digitalis to prevent an uncommon complication. This is analogous to the prophylactic administration of antiemetics when 100 per cent of patients are exposed to the hazards of drug therapy to decrease postoperative nausea and vomiting in possibly 5 per cent of patients treated. In the extreme case of this logic, we should perhaps re-evaluate the administration of multivitamin pills to all persons who might one day miss a meal.

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To the Editor:—We agree with Drs. Strong and Keats that the area of prophylactic digitalization is a controversial one. We have presented our recommendations based upon available data, and not clinical impression. There is, we agree, great need for a controlled double-blind study to answer many of the unanswered questions.

We have not recommended administration of digitalis to patients without heart disease,