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 overtaken 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,
but rather strict criteria for its use have been presented.

We do not share the view that "The treatment of heart failure during or after operation is a relatively simple therapeutic challenge with a high success rate." The treatment of heart failure in patients (who, as they point out, often have associated hypokalemia, alkalosis, or acidosis, bleeding and respiratory insufficiency) in our hands represents a very challenging therapeutic problem, not easily solved by administration of digitalis under these conditions.

We are aware of no evidence to support the statement that preoperative digitalization increases the incidence of postoperative ventricular tachycardia and/or AV block. There is no evidence to support the statement that if ventricular tachycardia responds to such agents as potassium, lidocaine, or diphenhydantoin, the arrhythmia was due to digitalis.

We disagree with the statement that the treatment of AV block or ventricular tachycardia is more difficult in digitized patients. The treatment of ventricular tachycardia is either the anti-arrhythmia agents mentioned or DC countershock. The treatment of AV block is either pacemaker introduction or isoproterenol infusion. We know of no reason why the therapy of heart block would be different if the patient had been digitized.

In regard to the effect of digitalis in patients with mitral stenosis and normal sinus rhythm it is clear, as Beiser has shown, that digitalis does not increase cardiac output in these patients. The reason that we recommend preoperative digitalization in patients with mitral and aortic stenosis is that, in the presence of digitalis, if atrial fibrillation occurs in the postoperative period it will be at a much slower ventricular rate than if they were not digitalized. Rapid ventricular response to atrial fibrillation in patients with previously-asymptomatic mitral stenosis or aortic stenosis may precipitate pulmonary edema.

We believe that postoperative congestive failure and/or arrhythmias are not uncommon in geriatric patients with heart disease. The occurrence and the treatment of these complications present a greater risk than the elective digitalization of selected patients before major surgery.

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Re: Malignant Hyperthermia

To the Editor.—The case of malignant hyperthermia reported by Capizzi et al. in the July issue (Anesthesiology 31: 97, 1969) has two unusual features. First, the 7-year-old child had been anesthetized twice during infancy (3 and 18 months of age) with no untoward results. Second, mump-like swellings of the parotid glands developed about 30 minutes after endotracheal intubation and persisted for several hours. Acute enlargement of all salivary glands has been observed by others soon after induction of anesthesia and intubation of the trachea, but it lasted only 3 to 15 minutes (Attas et al., Anesthesiology 29: 1050, 1968). Bilateral swelling of the parotid glands only has been associated with protein deficiency in both children and adults (Trowell and Jelliffe: Diseases of Children in the Subtropics and Tropics, 1958), and appears to be related to pancreatic dysfunction. It is not improbable that the mentally-retarded child reported by Capizzi et al. developed protein deficiency after being weaned from her milk diet. Since the etiology of malignant hyperthermia has not been ascertained yet, an error in protein metabolism should be kept in mind as a possible causative factor.

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