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Circulation

THE STONE HEART A distinctive fatal complication affected the hearts of 13 of 4,732 patients who underwent open-heart surgery at the Texas Heart Institute. During or at the conclusion of cardiopulmonary bypass an unyielding, firm, spastically contracted heart was discovered, which engendered the term "stone heart." These 13 patients were men, ranging in age from 42 to 73 years, being operated upon for calcific aortic stenosis supplemented, in three instances, by coronary-artery bypass grafts. Prominent among the diagnostic preoperative information were congestive heart failure (11 patients), angina pectoris (8 patients), left ventricular hypertrophy (8 patients), and prior myocardial infarction (4 patients). The patients submitted to preoperative cardiac catheterization showed severe elevations of aortic valve gradients and left ventricular systolic and end-diastolic pressures, and pulmonary hypertension. Post mortem, myocardial hypertrophy was found in all 13 patients; heart weights ranged from 620 to 1,277 g (mean 782 g). Evidence of coronary-artery disease was found in nine patients, three of whom had recently had infarctions. After these observations were made, the technique of cardiopulmonary bypass was modified for patients with identifiably ischemic myocardium, by the addition of hypothermia to 30 C, without coronary-artery perfusion, supplemented by exposure of the heart to cold saline solution until systemic normothermia was restored. The aortic clamp was then released. Subsequently, none of 266 patients undergoing aortic valve replacement has developed the stone heart. More definitive investigation of myocardial metabolism, particularly the relationship between adenosine triphosphate (ATP) deficiency and this syndrome, is suggested. *(Wukasch, D.C., and others: "The Stone Heart" Syndrome. Surgery 72:1071–1080, 1972.)*

ABSTRACTER'S COMMENT: This paper credibly and lucidly identifies the predisposing factors of a puzzling fatal complication of open-heart surgery. However, the efficacy of the suggested preventive measures is less convincing because the number on which the conclusion is based (266 patients) is less than the incidence (1:364) among the previous series of 4,732 patients. This complication has been reported subsequently from other centers, despite the use of myocardial hypothermia. The changes described probably arise secondary to excessive ischemia. At present there appears to be no reliable method of treatment. Whether anesthetic or inotropic drugs promote the appearance of the "stone heart" syndrome whenever myocardial ischemia has been produced deserves further study.