

Diseases of the Conduction System

Diseases of the conduction system are numerous and varied. The authors have selected a few representative entities for this section: complete heart block as a consequence of primary tumor of the atrioventricular node [47], complete heart block associated with aortic stenosis and surgical replacement of the aortic valve [48], and congenital complete heart block. Among women with lupus erythematosus who bear children, complete heart block is recognized in some of the offspring [49]. Congenital complete heart block, treated or untreated, in the infant may be followed by cardiac hypertrophy and its consequences.

Inflammatory diseases may involve the conduction system and cause complete heart block and other forms of delayed conduction. Chagas disease (chapter 3) is probably the leading cause of conduction disease on a global basis.

Dysplasia of the atrioventricular node may be seen as a cause of sudden death. Accessory pathways may lead to accelerated conduction and tachyarrhythmias. While Wolff-Parkinson-White syndrome may be the classic example of an accessory pathway, other types exist. The authors have observed a case of sudden death in a young woman because of the presence of a bundle of smooth muscle in the anterior leaflet of the mitral valve, presumably causing an accessory pathway.

The pathologic examination may reveal the underlying abnormality causing conduction disease, and the consequences of treating this disease with devices and drugs may also be observed. Chronic indwelling pacemaker and defibrillator leads may exhibit their own iatrogenic complication, including thrombus formation and valve dysfunction, and serve as a nidus for infection.

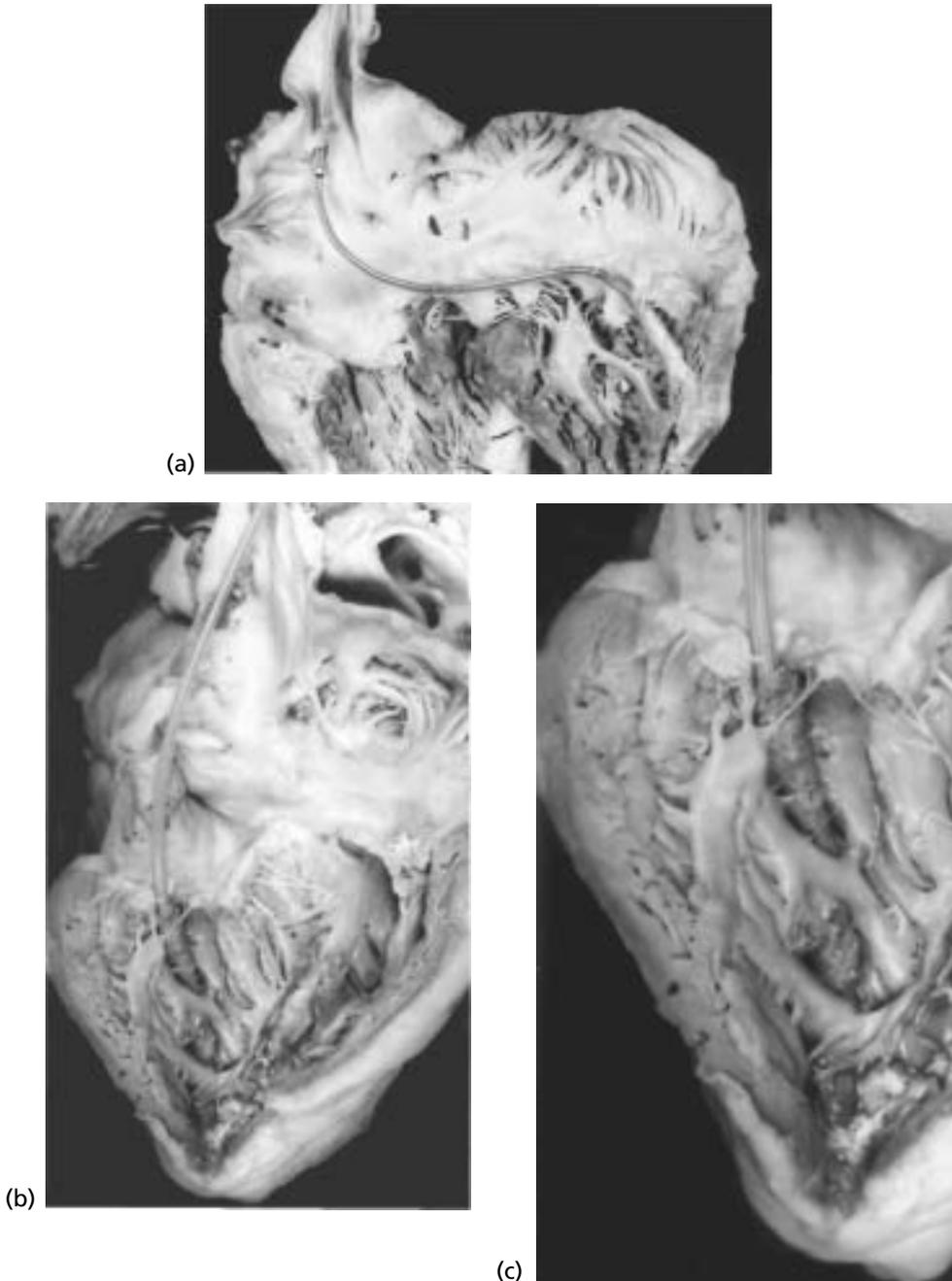


Figure 64 Consequences of pacemaker leads.

Illustrations from cases in which intravenous pacemaker leads have been in place for many months. (a) Right atrium and superior vena cava. The electrode lies attached to two sites: one at the superior vena cava–right atrium junction, the other adherent to the tricuspid valve. This may lead to tricuspid insufficiency. Male, 79 years. (b,c) The pacemaker electrode running from the superior vena cava through the right atrium to the right ventricle. Two views of the lead being surrounded by reactive connective tissue. Male, 72 years. Reprinted with permission from Becker et al. [91].

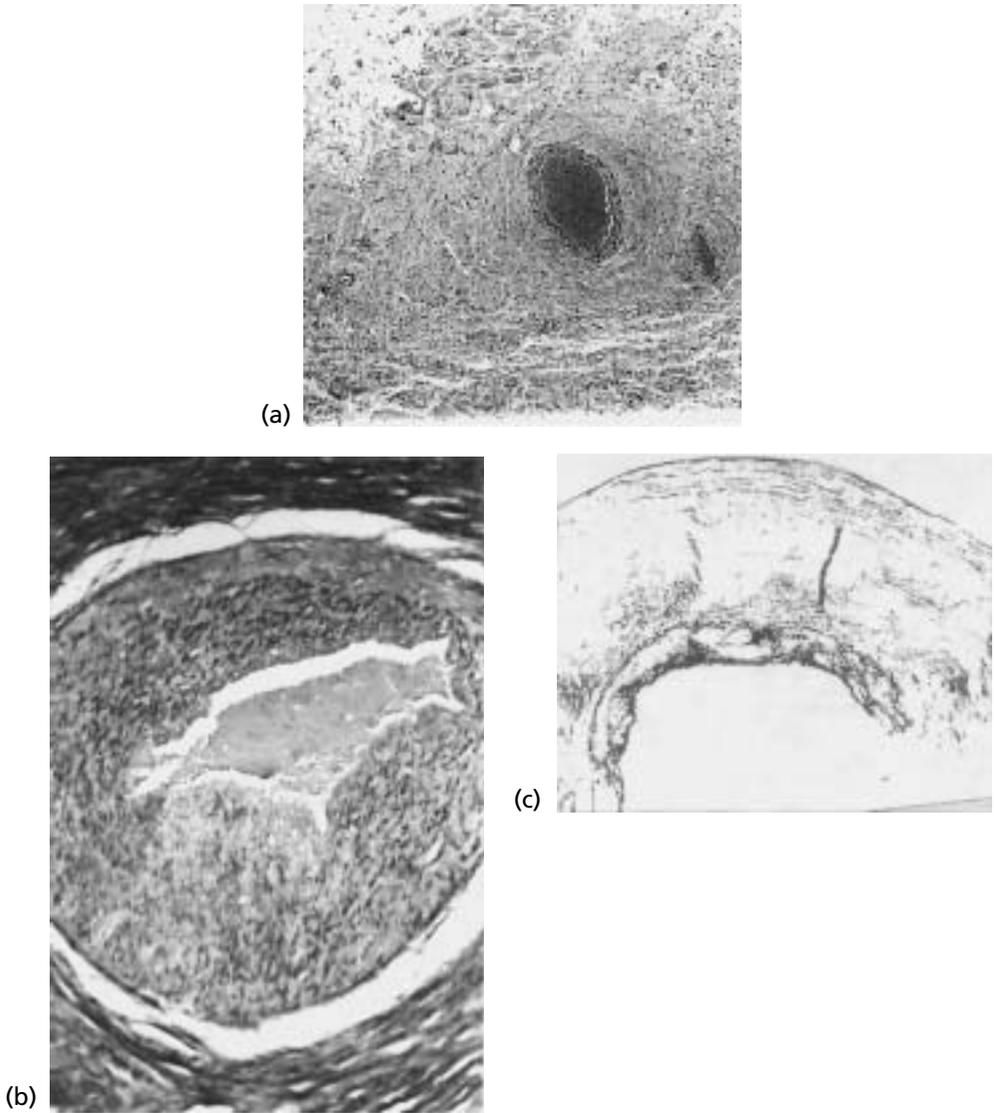


Figure 65 (a) Multifocal acute myocarditis in relation to sinoatrial artery.

(a) Photomicrograph showing a focus of acute inflammation adjacent to the sinus node artery, in a young woman with sudden death. This was the only pathologic abnormality found. Female, 29 years.

(b,c) Miscellaneous lesion of conduction system.

(b) Cellular proliferation (arterial dysplasia) in artery of sinus node. Sinus node ischemia may be responsible for sudden cardiac death. (c) Anterior mitral leaflet showing a column of smooth muscle running through the ventricular mitral side of the anterior leaflet; from a young woman who died suddenly. This may be the site of an accessory pathway for conduction ventricular.

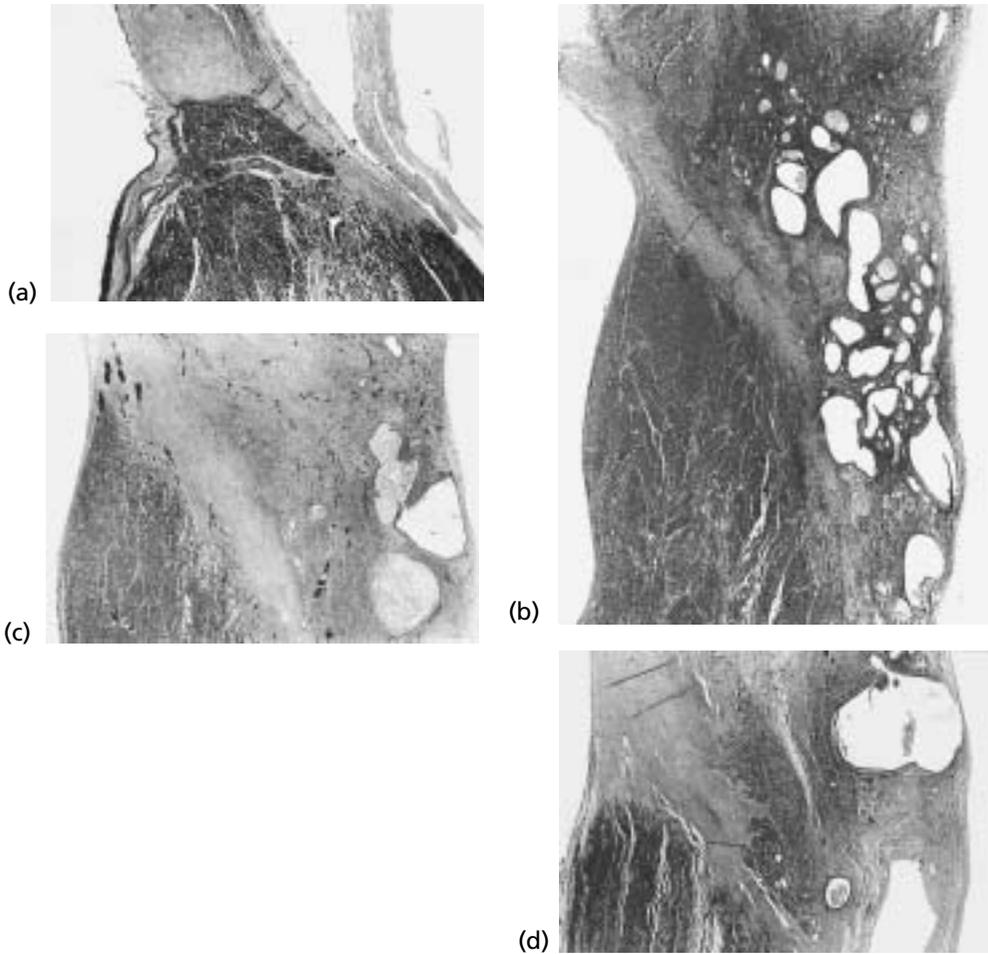


Figure 66 Mesothelioma of atrioventricular node causing sudden death.

(a) Atrioventricular node and surrounding right atrium and right ventricle. In this microscopic section no tumor is apparent. (b) Deeper cuts of the atrioventricular (AV) node. There are epithelial lined cystic spaces in the AV node representing a mesothelioma. (c,d) Details of the tumor. The mesothelioma is a benign cardiac tumor but may be responsible for sudden death. Premortem diagnosis is difficult.

Reprinted with permission from Ibarra-Perez et al. [47].

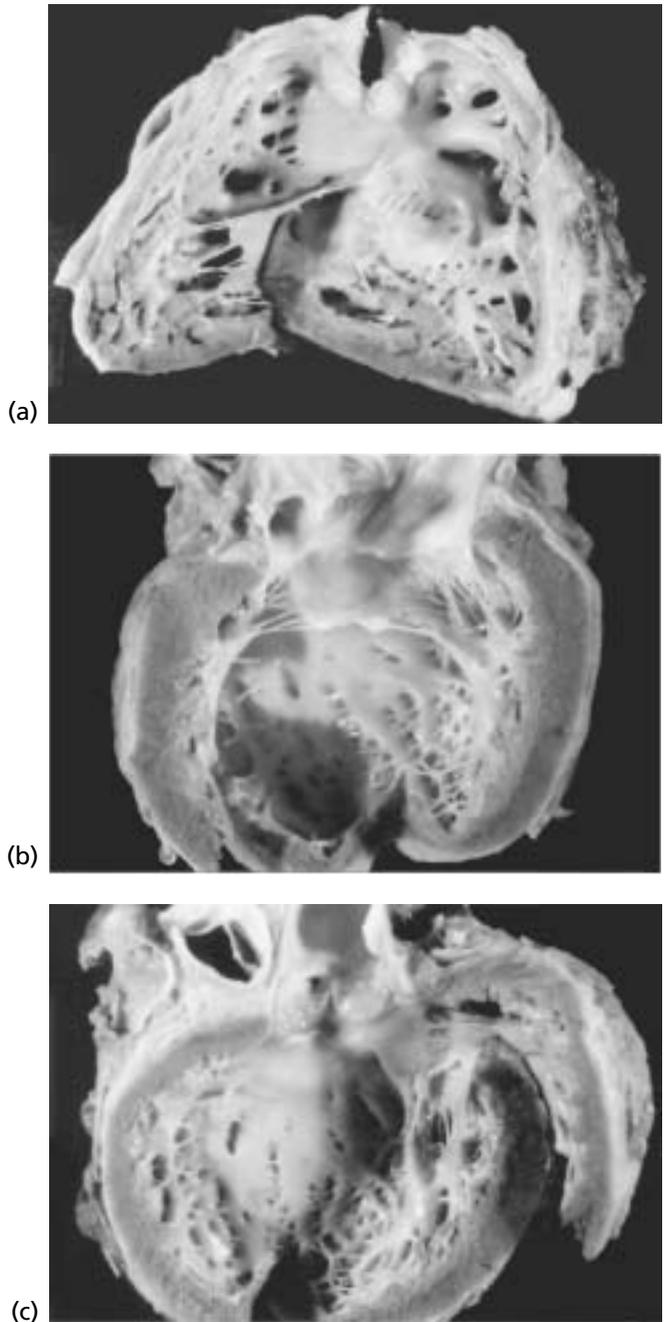


Figure 67 Congenital heart block.

Two-year-old male with congenital heart block, who was treated with a pacemaker. Despite treatment sudden death occurred. Examination of the heart revealed each chamber to be dilated.

(a) Right ventricle increased in volume with myocardial hypertrophy. (b) Left ventricle and left atrium. Dilatation of chambers with endocardial fibroelastosis. (c) Left ventricle and aorta. Left ventricle is dilated. Dilatation develops presumably because of increased diastolic filling time.