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only light perception was present in the right eye. Funduscopic examination showed a pale right disk with whitish, refractile, unmovable plaques causing branch occlusion of the inferior and superior temporal retinal arteries (Fig 1). There were no carotid arterial bruits. At the cardiac apex, a palpable thrill was present, and auscultation revealed a grade-5/6 holosystolic murmur radiating to the axilla. A chest x-ray film showed cardiomegaly with calcification of the mitral annulus. The electrocardiogram demonstrated sinus rhythm, ventricular extrasystoles, and left ventricular hypertrophy with secondary ST-T wave abnormalities. Results of routine laboratory studies, the aortic arch, and carotid angiograms were all normal. Cardiac catheterization and angiographic studies revealed severe mitral regurgitation and an enlarged left ventricle.

On Sept 18, 1974, the patient underwent valvular replacement. At operation the entire posterior leaflet of the mitral valve was heavily calcified, with calcification extending into the atrial wall for a distance of 3 to 4 cm. The calcium was extremely friable. Several chordae of the anterior leaflet were unattached. The valve was excised, and the calcium in the left atrium was dissected from the wall utilizing an endarterectomy spatula. Following this, a Starr-Edwards mitral prosthesis (model 6400) was inserted. The postoperative course was uneventful, and the patient was discharged on the 12th postoperative day. When examined on Jan 8, 1975, his visual defects were unchanged. The patient reported no subsequent embolic phenomena. Pathologic examination of the mitral valve revealed thickened and calcified valvular leaflets. The chordae tendineae were thickened and fused.

#### DISCUSSION

Hollenhorst<sup>3</sup> reported three patients with retinal embolizations that he thought were calcific. He listed the following distinguishing characteristics of calcific retinal embolization: (1) stark white appearance; (2) no heliographic reflections; (3) nonmobile plaques; (4) retinal infarction is commonly visible; and (5) the presence of calcific lesions of the cardiac valves on x-ray films. Others have noted similar clinical findings with pathologic demonstration of calcific retinal embolization.<sup>4,5</sup> Although the embolic material in our patient fortunately was not pathologically identified, the clinical presentation and findings on funduscopic examination were quite characteristic of calcific embolus.

Most authors reporting emboli associated with mitral valvular disease describe thrombotic episodes associated with mitral stenosis that may or may not be accompanied by mitral regurgitation.<sup>2,3,6</sup> Calcific embolization is not uncommonly seen in calcific aortic valvular disease,<sup>7</sup> but such embolization is an unusual complication of mitral valvular disease.<sup>5</sup> The extensive calcification of the mitral annulus with extension of the calcium to the left atrium, as seen in our patient, has been described pathologically.<sup>8</sup> It is easy to see how this friable material was the source of emboli.

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## Viral Inclusion Bodies in Tracheobronchial Epithelium of Asymptomatic Subjects\*

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**During a survey conducted for the cytodagnosis of early bronchogenic carcinoma, cytoplasmic viral inclusion bodies were found sporadically in tracheobronchial smears of asymptomatic patients of both sexes (ages ranging from 18 to 80 years) undergoing general endotracheal anesthesia for surgery. A review of 3,049 cases performed to assess the frequency of occurrence of this phenomenon showed a 1.1 percent incidence in all smears studied. There was no relationship between smoking habit, age, or sex and the presence of inclusion bodies; however, there was a marked seasonal incidence, with 60 percent of inclusion-bearing smears being found during the months of January through March.**

Cytoplasmic inclusion bodies found in the epithelia of the urinary tract and tracheobronchial tree have been reported by several authors;<sup>1-4</sup> but whereas affected cells were found in the urinary tract of both symptomatic and asymptomatic patients, such cells have only been reported thus far in the respiratory tract of subjects with viral disease and bronchogenic carcinoma.<sup>3</sup> We have been able to study the occurrence of this phenomenon because of the facility with which tracheobronchial secretions can be obtained during general endotracheal anesthesia.<sup>5,6</sup> Correlations have been attempted between the presence of cytoplasmic inclusions and sex, age, smoking habit, and reason for surgery

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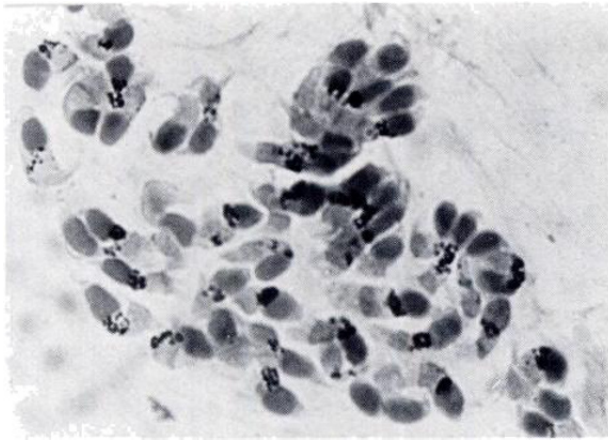


FIGURE 1. Cytoplasmic viral inclusion bodies in ciliated tracheobronchial epithelial cells (Papanicolaou stain, original magnification  $\times 400$ ).

of the patients concerned, as well as correlations with the time of year and other cytologic abnormalities.

#### PATIENTS AND METHODS

Three thousand forty-nine tracheobronchial smears randomly collected on a daily basis between April 1, 1973 and March 31, 1975 were reviewed for the presence of cytoplasmic viral inclusion bodies (Fig 1). The smears were obtained from consenting patients undergoing general endotracheal anesthesia for elective surgery; 5 ml of physiologic saline solution was instilled down the tracheal tube immediately after intubation and was suctioned for return within 30 seconds with a transparent catheter. The catheter was cut where it was seen to contain mucus. Secretions were retrieved with an applicator stick, smeared on slides, spray-fixed at once, and stained (Papanicolaou and PAS methods). Information obtained from all patients during a preoperative visit included age, sex, and smoking habit. In addition, all medical records were screened both before and after surgery to ascertain (1) the reason for surgery, (2) any associated unrelated pathologic findings, (3) the histopathologic findings from surgical specimens, (4) the results of other diagnostic tests, and (5) the date of surgery. Smears from patients who had suffered from known viral infections within 15 days preceding surgery and from those with prediagnosed cardiac and infective pulmonary diseases were not included in the study. All patients were screened for the first seven postoperative days; and the development of temperature elevations above  $38.4^{\circ}\text{C}$  ( $101.1^{\circ}\text{F}$ ), positive physical signs in the chest, and roentgenologic changes were noted.<sup>6</sup> The epidemiologic approach of Goldsmith and Berglund<sup>7</sup> was used. Variables among patients were listed, including age, sex, smoking habit, preoperative respiratory status, preoperative and postoperative diagnoses, and other associated diseases contributing to the physical status of the patient. The contribution of each variable to the factor studied was assessed. Significance of statistical correlations was calculated by the chi-square method, using the Yates correction factor, at values of  $P < 0.05$ , because the series was small in comparison to the total group of patients screened.

#### RESULTS

Of the 3,049 smears screened, 35 (1.1 percent) were found to contain ciliated epithelial cells with eosino-

philic cytoplasmic inclusion bodies (Papanicolaou stain). All were PAS-positive. Of these, 11 (31 percent) came from patients with extrathoracic malignant disease, one (3 percent) came from a subject with asymptomatic bronchogenic carcinoma diagnosed by routine roentgenographic study, eight (23 percent) came from subjects with benign tumors (uterus, breast, and prostate), and 15 (43 percent) came from patients suffering from a wide variety of conditions (inguinal hernia, retinal detachment, cholecystitis, fractures of the extremities, complications of pregnancy, tonsillitis, and peptic ulcer). No correlation could be found between the presence of inclusion bodies in smears and the age, sex, or smoking habit of patients. Although the incidences of malignant and benign tumors among patients with inclusion bodies appeared to be high (34 percent and 23 percent, respectively), they were not found to be significant when compared with the incidences of these tumors in the entire population screened (26 percent and 20.4 percent, respectively). No relationship was found between the presence of viral inclusion bodies and other abnormalities noted in smears; however, when the frequency of occurrence of inclusion bodies was assessed in relation to the season of the year, 60 percent (20) of all these smears (Fig 2) were found to have been collected during the months of January through March.

One patient, who smoked 30 cigarettes a day, developed a temperature above  $38.4^{\circ}\text{C}$  ( $101.1^{\circ}\text{F}$ ) for the first three postoperative days. There were two nonsmokers who developed a temperature above  $38.4^{\circ}\text{C}$  ( $101.1^{\circ}\text{F}$ ) together with positive signs in the chest and roentgenologic infiltrates. One of these had an asymptomatic bronchogenic carcinoma, and the other had metastatic carcinoma of the breast and chronic lymphocytic leukemia. All signs disappeared within three days after the institution of bronchial washing and therapy with intermittent positive-pressure breathing. All other patients had uneventful postoperative courses.

#### DISCUSSION

Other investigators have found that the respiratory tract has the highest rate of viral isolation of all body

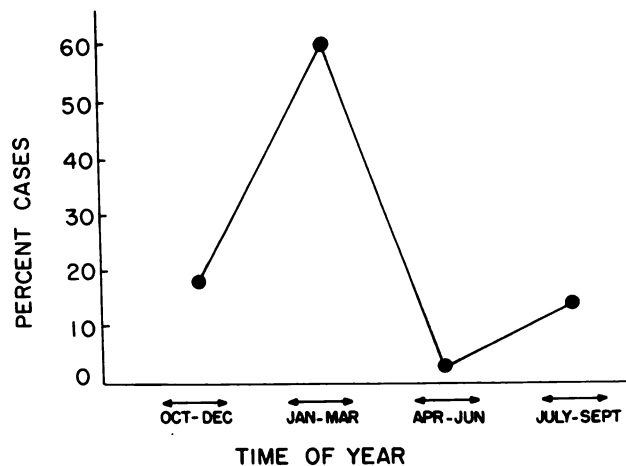


FIGURE 2. Seasonal incidence of inclusion bodies in tracheobronchial ciliated cells of asymptomatic patients.

systems.<sup>8</sup> Whitehead<sup>9</sup> has suggested that inapparent infection with respiratory as well as other viruses acts as a reservoir<sup>1,3</sup> for epidemic periods. Unlike other descriptions of patients with such inclusions, our subjects had no respiratory symptoms. Our findings are more in line with those of Ström,<sup>4</sup> who found viral shedding in the urinary tract of apparently healthy individuals. The Tecumseh and other studies of respiratory infections<sup>10-12</sup> have demonstrated an increased incidence of infection with coronavirus, respiratory syncytial virus, and rhinovirus during the winter months; and it is, therefore, probable that the majority of our patients had asymptomatic infections with these viruses.

The low postoperative respiratory complication rate noted in this series seems to indicate that the presence of viral inclusion bodies is not a precursor of respiratory disease (even under stress conditions).

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## Sick Sinus Syndrome Requiring Permanent Pacemaker Implantation in a Patient with Mirror-Image Dextrocardia\*

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**A patient with the sick sinus syndrome accompanying mirror-image dextrocardia which was associated with double superior venae cavae and an absent inferior vena cava is presented. A permanent transvenous demand pacemaker was inserted because of repeated episodes of dizziness and a documented 3½-second period of asystole. Precise knowledge of the venous system and the location of the apex of the right ventricle was necessary prior to permanent pacemaker implantation.**

A group of disorders affecting sinus-nodal function have recently been described which may be manifested by either a slow or fast heart rate and may or may not be associated with symptoms of dizziness and syncope. The term, sick sinus syndrome,<sup>1,2</sup> has been used and includes inadequacy of the sinoatrial node manifested by both persistent sinus bradycardia and cessation of sinus rhythm with replacement by an atrial or junctional rhythm. This report presents an adult case of sick sinus syndrome with mirror-image dextrocardia and situs inversus, double superior venae cavae, single spleen, and absent inferior vena cava with azygos continuation. The technique of permanent pacemaker insertion in dextrocardia is described.

#### CASE REPORT

This 48-year-old woman first came to this hospital in 1965 with the chief complaint of dizziness. Findings from the physical examination and the x-ray films of the chest and abdomen were consistent with a diagnosis of dextrocardia with situs inversus. The electrocardiogram showed a junctional rhythm with a rate of 34 beats per minute and QRS morphology typical of dextrocardia. The patient was treated with sublingual administration of isoproterenol with good results. The current admission in March 1974 was prompted by several episodes of dizziness and one episode of syncope.

#### Physical Examination on Admission

Physical examination on admission revealed blood pressure of 110/70 mm Hg in both arms. Carotid pulses were equal and of good quality. The point of maximal impulse was

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