Inadvertent Myocardial Biopsy
A Potential Hazard during Left Ventricular Puncture

By DAVID H. BLANKENHORN, M.D., ROGER W. JELLIFFE, M.D.,
NEAL F. AMSDEN, M.D., AND JOHN L. JOHNSON, M.D.

The recognized serious complications of cardiac needle puncture are ventricular fibrillation,1 pericardial tamponade,2,3 pneumothorax,5 and intramyocardial injection of radiopaque contrast media.2,4 Less serious complications are hypotension, hemoptysis, and subcutaneous emphysema.3 This report describes a potential hazard of myocardial needle puncture which to our knowledge has not been previously reported.

Catheterization was performed to evaluate the severity of aortic stenosis in a 41-year-old Mexican man who gave a history of rheumatic fever in childhood and who had recently suffered the onset of symptoms of mild congestive failure. Calcification was visible in the area of the aortic valve by radiography.

After sedating the patient with Demerol, a no.-7 Lehman catheter was introduced through the right brachial vein into the pulmonary artery. Pulmonary artery pressure was found to be 65/40 and right ventricular pressure 65/5 mm. Hg. A Ross-Braunwald needle was introduced into the left atrium from the left femoral vein (the right femoral vein was not suitable because of a previous surgical procedure.)

Left ventricular puncture was performed with a no.-18 thin-walled needle connected by a short length of polyethylene tubing to a Statham P23D strain gage in such a manner that the system could be flushed with a syringe at the strain gage. The needle was introduced via the parasyphoid approach of Ponsdomenech and Nunez.5 It was flushed immediately prior to entry into the heart and the right ventricle was entered with ease. Right ventricular pressure observed on an oscilloscope was identical to that previously recorded through the Lehman catheter. The needle was next advanced through the interventricular septum and, as this was done, pressure recorded from the needle tip disappeared. Several premature ventricular contractions occurred at this time. As the needle was felt leaving the interventricular septum, a damped ventricular pressure higher than right ventricular was observed and so forward motion of the needle was stopped. After several beats, this pressure grew smaller and could no longer be recorded. It was believed that the needle tip had slipped back into the interventricular septum. However, advancing the needle and rotating the bevel did not cause a return of pressure and no blood could be withdrawn through the needle. An attempt to flush the needle with saline was given consideration because this has been advocated as one means to ascertain whether a needle tip lies free in ventricular cavities.4 This was not done; instead the needle was withdrawn from the chest. A 1 by 3 mm. firm core of tissue was easily expelled from the needle by flushing. This would certainly have been discharged into the circulation if the needle had been flushed while in the heart. Following this, the needle was introduced along the same track, through the right ventricle, interventricular septum, and into the left ventricle. An undamped left ventricular pressure of 200/15 was obtained immediately on entering the left ventricle. Brachial artery pressure recorded simultaneously was 115/70.

The patient experienced no symptoms during the procedure; no change in pulse or blood pressure occurred during 6 hours of observation. The following day he was up and about the ward. A chest x-ray and electrocardiogram 3 hours after the procedure and the following day showed no change.

The plug expelled from the needle was an elongate cone-shaped mass. On microscopic examination, the tissue was composed of anastomosing fibers of striated muscle containing rather large block-shaped nuclei typical of myocardium (fig. 1). The striations were sharp and clear cut. The muscle fibers appeared slightly enlarged. The capillary network was normal, as were the small arterioles.*

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From the Cardiac Catheterization Laboratory, Los Angeles County Hospital, Los Angeles, California.

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In the last 24 months we have performed 37 parasympathetic punctures of the right and left ventricle without serious complications.* It is our practice to employ a closed system, which allows continuous observation of pressures recorded from the needle tip. Immediately before the heart is entered, the needle is flushed to ascertain if it has been occluded while passing through the chest wall. Passage from the right ventricle through the interventricular septum into the left ventricle can be detected by a changing sense of resistance to the needle and by change in recorded pressure. During the procedure reported here, left ventricular pressure was recorded for an instant as the needle was felt leaving the interventricular septum. We therefore believe that cardiac biopsy was obtained as the needle traversed the interventricular septum. It seems probable that the specimen of myocardium did not completely fill the needle at first and, as the left ventricle was entered, several beats were recorded before the biopsy specimen shifted and occluded the needle. This unusual occurrence mimicked events that previously have been observed when a needle in the left ventricle is drawn back into the interventricular septum.

When first describing parasympathetic cardiac puncture, Ponsdomenech and Nunez5 pointed out that care must be taken to avoid plugging the needle during passage through the chest wall. They advocate use of a stylet for this purpose. We have found continuous observations of pressure at the needle tip and a preliminary flush just before the heart is entered to be effective in discovering potential emboli from the chest wall. After the heart has been entered, the danger that a piece of tissue may plug the needle must be checked each time it is advanced. We believe this can safely be done by monitoring intracardiac pressure, provided injection through the needle is scrupulously avoided when pressures are damped.

*Since this manuscript was submitted the authors have observed one serious complication of parasternal left ventricular puncture, a fatal hemorrhage into the pericardium.

Summary

The hazard during left ventricular puncture is described of inadvertent myocardial biopsy and possible embolization from it.

References


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Traditional Remedies

Digitalis is a notable example. In its early days it was a true old wives' cure for dropsy. Withering, in 1776, having learned from an old Shropshire woman of the virtues of the foxglove, tried it in his practice, and was convinced of its value. But he no more knew how it cured than he knew that dropsy was not a disease but a symptom of many diseases. Half a century passed before Bright drew attention to the association of renal disease with albuminous urine, and so paved the way for a distinction between renal and cardiac dropsy. And we can afford to smile at Withering's disappointment at the failure of his foxglove leaves to cure a case of ovarian cyst—then regarded as a form of dropsy. The final demonstration of the specific effect of digitalin and certain allied alkaloids upon the disorder of cardiac rhythm which we now know as auricular fibrillation belongs to the present century.—Dr. Maurice Shaw (Medical Facts and Fallacies, BM. J. 1936). The Quiet Art: A Doctor's Anthology. Compiled by Dr. Robert Coope. Edinburgh & London, E. & S. Livingstone Ltd., 1952, p. 137.
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