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Rôle of Heart Sounds in Diagnosis of Experimental Endocarditis Lenta in Rabbits Before Death.*

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MacNeal and his coworkers[1, 2] have successfully transferred to rabbits the human strains of *Streptococcus viridans* obtained from active cases of subacute bacterial endocarditis. The vegetative lesions developed in rabbits on the cardiac valves, which however were not known to be previously injured or diseased. Other localizations of the infection were often present. The diagnosis of endocarditis before death was attempted on the basis of successively positive blood cultures, development of anorexia and marked loss of weight. These criteria were often inadequate, as proved by autopsy.

The difficulty in antemortem diagnosis of active experimental endocarditis has greatly hampered the therapeutic approach to this problem, which is admittedly an important one. In view of the large valvular lesions developed, often producing a severe stenosis, it was logical to assume the development of murmurs and modification of the heart tones. Therefore each animal was examined at frequent intervals, in unbiased procedures, by a stethoscope. Some were selected for a stethogram during the experimental period. The rapidity of the heart, the respiratory tones and the animal movements had discouraged this procedure previously. These objections were partly overcome during a mechanical asphyxia of the animal. A marked bradycardia and a prolonged apnea was usually produced by this procedure; the prolonged diastole aided the differentiation of the heart sounds. The results and correlations are summarized in Table I.

It is concluded that a study of the heart sounds is of distinct value in detecting experimental endocarditis in rabbits. Striking correlation

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1 MacNeal, Ward J., Spence, Martha Jane, and Wasseen, Marie, PROC. SOC. EXP. BIOL. AND MED., 1939, **40**, 473.

2 MacNeal, Ward J., Spence, Martha Jane, and Wasseen, Marie, *Am. J. Pathol.*, 1939, **15**, 695.

TABLE I.

	Ante-Mortem findings		Post-Mortem findings
	Auscultation	Stethogram	Cardiac changes and their correlation
Total rabbits studied	29	14	29
Definite murmur	4	3 of those positive on auscultation were also positive by the graphic study. One was not studied.	All 4 rabbits had large stenosing vegetations on the mitral valve.
Uncertain murmur	1	The same one was uncertain by graphic study.	This animal had a small vegetation about 1 mm in diameter on the mitral valve.
Transient murmur	1	No observation made.	This animal showed a slight roughening of the mitral cusps.
Gallop rhythm or modified sounds	1	This same one and also 3 others were positive in the graphic study. One of these 3 later developed a definite murmur and stenosing mitral lesion and is included in the Definite Murmur Group above.	The one animal positive on auscultation showed a large myocardial infarct of the left ventricle, but no vegetations on the valves. Another had small smooth vegetations on mitral and aortic valves. In one the heart was negative.
No murmur	22	7 of these were negative also by graphic study. The other 15 were not studied.	Of this negative group, one animal had two large smooth vegetations above the mitral valve, without stenosis; 4 had small vegetations on one or more valves; 4 showed gross changes in the papillary muscles; one had a mural endocardial lesion; 12 had negative post-mortem heart findings.

existed between auscultatory and stethogram findings when severe mitral stenosis was produced by the vegetations. Modified sounds usually occurring in presystole were not easily detected by auscultation but were recorded by the stethogram. Minimal lesions of the valves, papillary muscles, or mural endocardium were usually not detected by auscultation and recording of sounds from the apical precordial region.