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Progressive Muscular Anemia in the Heart of a Dog.*

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Evidence has already been presented¹ to show that interruption of the blood supply to a given ventricular muscle band will produce a characteristic and constant alteration in the electrocardiogram.

TABLE I.†

Muscle	Characteristic Electrocardiogram	
S.B.S.	T very neg. in I, II, III	R-T depressed in I S-T elevated in II, III
D.B.S.	T positive in I, II, III (Fig. 1a)	R-T very elev. in I, II, III
S.S.S.	T slightly neg. in I, II, III	R-T elevated in I, II, III
D.S.S.	T ₁ neg., T ₃ pos. (Fig. 1b)	R-T " " I S-T very depressed in II, III

† Note correction of misprint in original publication.

The present report is concerned with consecutive electrocardiograms from a single dog in which the coronary blood supply to muscle after muscle was obstructed. The technique was as previously described, allowing half hour intervals between successive ligatures. Ligatures were placed near the apex on the vessels supplying: the internal portions of the Superficial Sino- and Bulbo-spiral muscles, the deep Sino-spiral (both right and left portions), the deep Bulbo-spiral, the Septum (4 ties 1 cm. apart from below upwards on the anterior descending coronary) and one on the branch from the left circumflex coronary to the upper posterior septum. Finally, the whole left circumflex branch of the left coronary was ligated. At this time the only adequate blood supply was to a small area on the anterior surface of the right ventricle, to the right portion of the scroll muscles and to the bundle of His.

As soon as a vessel is ligated the area involved ceases to contract, assumes a dusky color and bulges slightly. The electrocardiogram indicated that when the ligations were made serially in one animal, each characteristic modification reported previously was again introduced as a typical addition to or a subtraction from the previous tracing.

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¹ Robb, J. S., *Proc. Soc. Exp. Biol. and Med.*, 1933, **31**, 311.

The amplitude of the records became progressively greater as the lesions progressed. When only this small area of the right ventricle could be seen to beat there was a high R in Lead I. This experiment was later repeated with similar results.

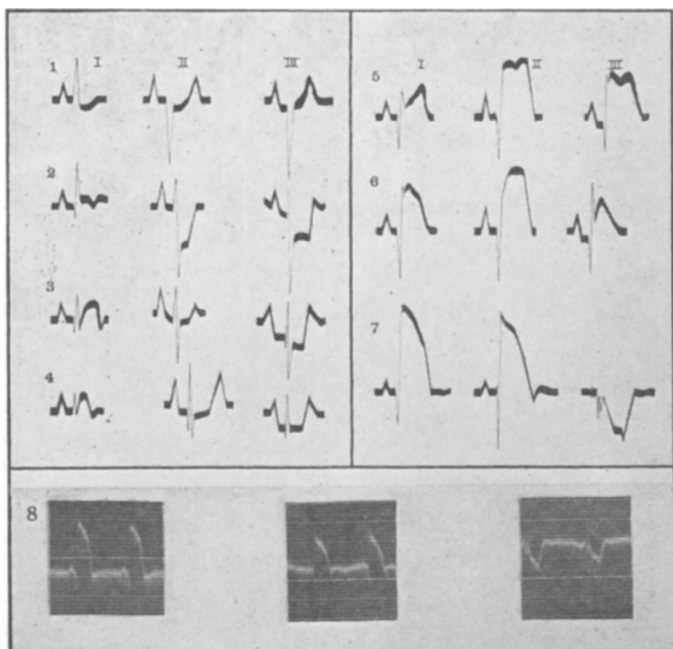


FIG. 1.

Original tracings taken with standard technique. Numbers 1 to 7 redrawn to scale.

1. Operated control, indirect leads.
2. Initial lesion of deep sino-spiral.
3. Characteristic alteration for lesion of the superficial bulbo-spiral, R-T elevation of I lowered, S-T much elevated in II, III as compared to No. 2.
4. Lesion of superficial sino-spiral, further elevation of R-T segment. Note lessened S in all leads.
5. Anemia of the deep bulbo-spiral elevated the R-T segments in all leads.
6. Septal involvement, note the exaggeration of Q and the increased downstroke of R in III.
7. Left circumflex coronary ligated. Only a small portion of the right ventricle beating. Note the tall R in lead I.
8. Original tracing from which No. 7 was redrawn.

In these experiments injury to the septum resulted in the development or in the exaggeration of the Q wave. Very large areas could be damaged without fibrillation appearing provided only the blood supply to the bundle of His remained intact.

Conclusions. 1. A characteristic electrocardiographic change is present for each ventricular muscle, regardless of the order of involvement, when one after another is deprived of its blood supply.

2. The type of complex called a Laevogram by Lewis² and a Dextrogram by Barker, Macleod and Alexander³ is obtained when only a small area of the right ventricle is visibly contracting.

² Lewis, T., 1925, *Mechanism and Graphic Registration of the Heart Beat*, Shaw and Sons, London.

³ Barker, Macleod, and Alexander, *Am. Heart*, 1930, **5**, 720.