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Localization of Premature Beats in the Mammalian Ventricle.*

JANE SANDS ROBB, ROBERT CUMMING ROBB, AND J. G. FRED HISS.

From the Departments of Pharmacology and Medicine, Syracuse University.

Premature beats, excited by 2 methods, have been recorded by means of the 3 standard electrocardiographic leads, photographed simultaneously. (1) When coronary arteries are ligated, as previously reported,^{1, 2} immediately upon ligation there often occur transient showers of spontaneous premature beats. Comparing the records of various experiments, it is evident that the form of the premature beats varies but that in experiments involving any one muscle the form is relatively constant. (2) In other experiments premature beats were elicited from the apex of the left ventricle by mechanical stimulation.

In the lower third of the left ventricle there are 2, and only 2 muscles. The superficial sino-spiral forms the anterior horn of the apex and penetrating becomes the anterior papillary muscle. The superficial bulbo-spiral, in a similar manner becomes the posterior papillary. If 2 types only of premature beats are obtained in this area, an anatomical basis for that fact is available.

The form of the premature beats elicited by mechanical stimulation of the superficial sino-spiral muscle was found to be the same as that of the spontaneous premature beats which occurred when that muscle lost its blood supply. Likewise the same relation between the spontaneous and artificially excited premature beats was observed for the superficial bulbo-spiral. Figure 1 shows that the

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¹ Robb, J. S., Easby, M., and Hiss, J. G. F., *A. J. M. S.*, 1934, **188**, 835.

² Robb, J. S., Hiss, J. G. F., and Robb, R. C., *Am. Heart*, 1935, **10**, 287.

form of such premature beats tends to be the reciprocal of the alteration produced when respective muscles are injured.³

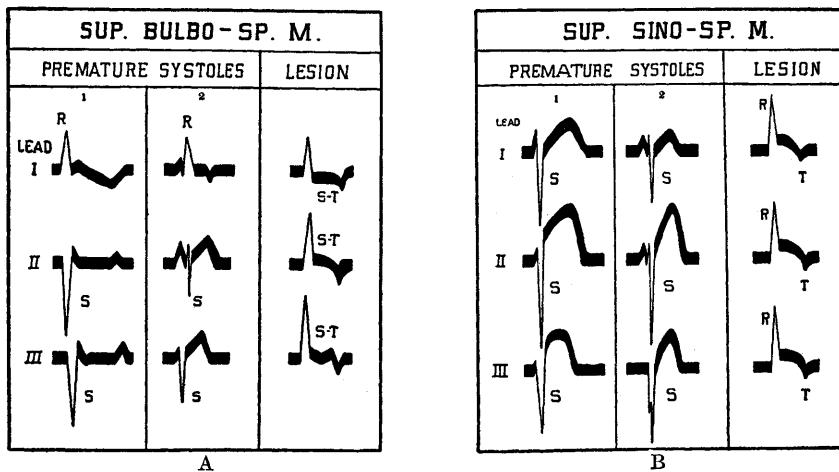


FIG. 1.

A. Superficial Bulbo-Spiral muscle. Column 1, three simultaneous leads showing mechanically stimulated premature beats. Column 2, premature beats occurring spontaneously. The column marked "Lesion" indicates the alteration due to infarction of the muscle.

B. Gives the same data for the Superficial Sino-Spiral muscle. Note that the T deflection of the premature beats is positive and that in infarction the T is negative. Also note the reverse direction of the quick deflections.

That 2 types of premature beats may be elicited from nearby points at the apex has been observed previously. Particular reference is made to figures 7a and 7b of the paper by Barker, Macleod and Alexander.⁴ Their points 2 and 3 obviously lie on the superficial sino-spiral and with equal certainty points 4, 5, 6 and 8 lie on the superficial bulbo-spiral, 4 at the apex and 8 at the base. The forms of the premature beats recorded from these 2 groups of points are the same as those hereby reported. These authors discuss the previous attempts at localization of premature beats, that is, right or left sided as opposed to apex or base, and give a fairly complete bibliography.

These data allow one to suggest that localization may be possible in terms of the muscle involved.

³ Robb, J. S., PROC. SOC. EXP. BIOL. AND MED., 1933, **31**, 311.

⁴ Barker, P. S., Macleod, A. G., Alexander, J., *Am. Heart*, 1930, **5**, 720.