

صورة القلب في أجنة الأغنام المصابة بمرض حمى الوادي المتصدع

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فصت قلوب أجنة الأغنام المصابة بمرض حمى الوادي المتصدع من الناحية الباثولوجية وقد وصفت التغيرات الموجودة بعد صبغها بالصبغات المطلوبة المتعددة ، وقد وصفت المادة القلبية المترسبة بالحاجز ما بين البطينيين ، وقد نوقشت نتائج البحث عن ماهية هذه المادة .

ويعتقد الباحثون ان هذه المادة القلبية يمكن ان تكون ناتج جانبي لعملية التمثيل الغذائي للجليكوجين والذي يضطرب تمثيله في مرض حمى الوادي المتصدع .

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BASOPHILIC DEGENERATION OF THE MYOCARDIUM
IN SHEEP-FOETUSES INFECTED WITH RIFT VALLEY FEVER.
(With 2 Figures)

By

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SUMMARY

Basophilic degeneration of the myocardium, which is considered to be a primarily human affection, was observed in two foetuses out from eleven aborted ones from a sheep-flock infected with Rift Valley fever. In sections stained with H&E the lesion appeared as a basophilic material subendocardially, in the ventricular septum, valves and appendages. This material stained positive with Meyer's mucicarmine and PAS stains, and manifested strong metachromasia with toluidine blue. The nature of the deposited material is discussed and is suggested to be a by-product of glycogen metabolism based upon the association of disturbance of glycogen metabolism in infections with Rift Valley fever.

INTRODUCTION

The presence of basophilic finely granular material in the cytoplasm of myocardial fibres in sections stained with haematoxylin and eosin has been described for the first time by GEIPEL (1905). This condition has been called mucinous degeneration (SCOTTI, 1955), cardiac colloid (HAUST *et al.*, 1962), mucoid degeneration (SPENCER, 1950), basophilic mucoid degeneration (MANION, 1965) and basophilic degeneration (HAUMEDER, 1935; LIEBEGOTT, 1936/ 1937; CARDOSO, 1940; GROXATTO and

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CHIRIBOGA, 1950). The nature of the abnormal deposit has been suggested to be a chromatin that escaped from the nuclei (SCHULZ, 1921) or nuclear material (DNA, RNA or both) (GEIPEL, 1905; CROXATTO and CHIRIBOGA, 1950), mucoid substance (HEWITT, 1910; HAUMEDER, 1935; LIEBEGOTT, 1937; DOERR, 1952 ; SCOTTI, 1955; HAUST et al., 1962), mucoprotein (SREWER, 1951), glycogen-protein complex (PUCCINI and STIGLIANI, 1945; DANILOVA and MEDVEDEVA, 1966) or a by-product of glycogen metabolism (KOSEK and ANGELL, 1970; ROSAI and LASCANO, 1970).

The condition has been stated by ROSAI and LASCANO (1970) to be a primarily human affection, and only one report dealing with description of basophilic degeneration of the myocardium in animals, namely, a whale and a horse, has been found in the literature written by SCOTTI (1955).

The present work describes a similar condition found incidentally during examination of aborted fetuses from ewes infected with Rift Valley Fever.

MATERIALS AND METHODS

The material consisted of two aborted fetuses among eleven ones obtained from a sheep-flock subjected to an outbreak of Rift Valley Fever. Tissue samples from the heart were fixed in 10% formalin solution and embedded in paraffin. Sections, 5-6 u thick, were stained with haematoxylin and eosin. Further staining methods were Meyer's mucicarmine, toluidine blue 1%, and PAS stain.

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RESULTS

The myocardium of the two foetuses showed an infiltration of lightly basophilic material that appeared either homogenous or finely granular in sections stained with haematoxylin and eosin. Deposition of this material was found subendocardially, in the right ventricle; interventricular septum, aurico-ventricular valves and appendages. The material showed patchy distribution and appeared to extend from subendocardially deep into the myocardium. The borders of the infiltrating material were irregular and some fibres escaped from being affected. No scattered foci of similar characteristics could be detected at a distance from the progressing border or in the intercellular spaces; the interstitial connective tissue was likewise free. When the muscle cells were affected, deposition seemed to have had occurred peripherally at first in the cytoplasm extending centrally to surround the nucleus. The latter appeared always pyknotic and mostly were surrounded with a densely eosinophilic remains of the cytoplasm which concentrated well with the lightly bluish stain of the infiltrating material.

In sections stained with Meyer's mucicarmine, the deposited material did not stain homogeneously intense, varied from strong to light pink in colour. The strongest reaction was shown at the periphery of the infiltration. This material manifested strong metachromasia with toluidine blue, and was positive to PAS stain.

DISCUSSION

The deposited material observed in the myocardium of sheep-foetuses in the present study was similar in its staining characteristics to that described in a whale and a horse by SCOTTI (1962) and in man by many investigators. This material was reported to be stained bluish with haematoxylin and eosin, and gives a positive reaction with Meyer's mucicarmine, Best's carmine and PAS and is metachromatic for toluidine blue (SCOTTI, 1955, 1962; RAUST et al.; 1962; FOWLER et al., 1961; ROSAI and LASCANO, 1970).

SCHULTZ (1921) suggested that the deposits in the muscle of a cretin suffered from basophilic degeneration were chromatin that has escaped from the nuclei. Similarly, GEIPEL (1905) and CROXATTO and CHIRIBOGA (1950) reported that these deposits represent nuclear material dispersed in the cytoplasm. The possibility that basophilic degeneration is consisted of nucleic acids was discarded by DIETRICH (1940/1941), SCOTTI (1955) and ROSAI and LASCANO (1970) as the material was negative for Feulgen reaction, Lillie's azur A-eosin 8, and is unaffected by the action of ribonuclease. Most investigators (HEWITT 1910; HAUMEDER, 1935; LIEBEGOTT, 1937; FOSTER and BARR, 1940; SPENCER, 1950; DOERR, 1952; SCOTTI, 1955; HAUST et al., 1962) considered basophilic degeneration to be of mucinous or mucoid nature based on the positive reactivity to Meyer's mucicarmine and the resistance to the action of diastase.

Based on histological, ultrastructural, histochemical and biochemical studies, KOSEK and ANGELL (1970) and ROSAI and LASCANO (1970) were against that the substance is muco/glycoprotein or an acid mucopolysaccharide, and postulated that the

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deposited material in basophilic degeneration is made of a glucan, and that it represents a by-product of glycogen metabolism possibly brought upon by an enzymatic deficiency of glycogenesis-glycogenolysis pathway. The reason for the acidic properties of basophilic degeneration-material has been suggested by ROSAI and LASCANO (1970) to be located in the glucan units. These authors further added that two possibilities should be considered regarding this acidic properties, either the stains employed are not actually demonstrating acid groups but rather another type of reaction inherent to the glucan molecule or that it is due to the presence of other chemical groups (i. e. phosphate) either esterified in the glucan or passively enmeshed among glucan aggregates.

In the present study, the histochemical reactions used do not allow us to make a final conclusion on the nature of the deposited material. However, it is worthwhile to notice that infection with Rift Valley Fever virus is associated with disturbance of glycogen metabolism. Depletion of glycogen from the liver was noticed in experimentally infected mice (KOSEKI, 1955; McCAVRAN and EASTERDAY, 1963). Similar changes in the cardiac or skeletal muscles, however, have not been recorded. To what extent this changes of the glycogen content of the liver bears a direct relationship to the development of basophilic degeneration in the myocardium, can not be speculated. The association of basophilic degeneration with hypothyroid patients (H AUMEDER, 1935; UMEDA, 1940/1941; FISCHER & Mulligan, 1943; FOSTER and BARR, 1940; HOLLDAK 1947/19 8; BREWER, 1951) has also been attributed to the role of the thyroid hormone in regulation of the metabolism of cardiac glycogen (ROSAI and LASCANO, 1970). It is finally to be pointed out that, this

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pathological lesions may not represent a consistent changes in cases of infection with Rift Valley Fever since it was observed in only two cases out of eleven.

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Fig. (1):a. Subendo cardial area of the heart showing patchy distribution of groups of muscle- fibres with basophilic degeneration (arrow) (x 100)



Fig. (1):b. The same area showing affected muscle fibres (1) and an apparently non- affected ones (2) (x 400).

EXHIBIT 100

STATE OF VIRGINIA
IN SENATE
January 12, 1955

REPORT OF THE
COMMISSIONERS OF THE
LAND OFFICE

IN RESPONSE TO A RESOLUTION
PASSED BY THE SENATE
ON JANUARY 11, 1955

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STATE OF VIRGINIA
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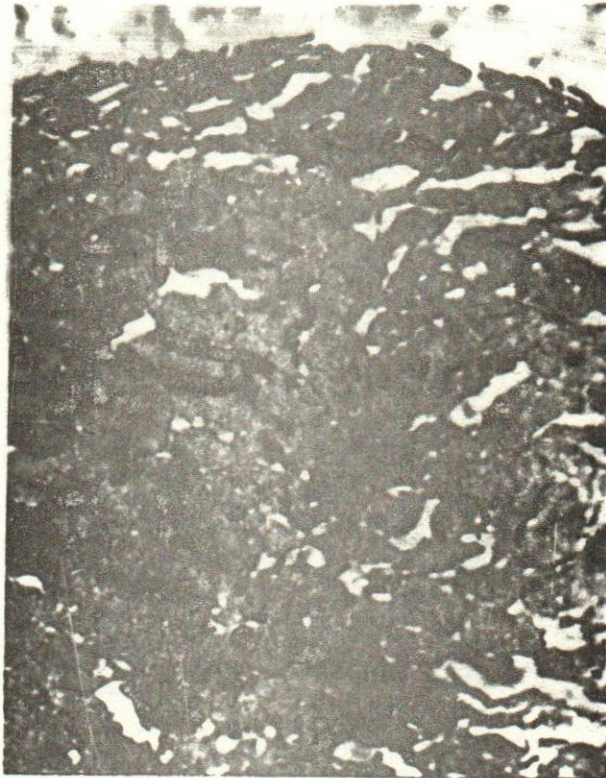
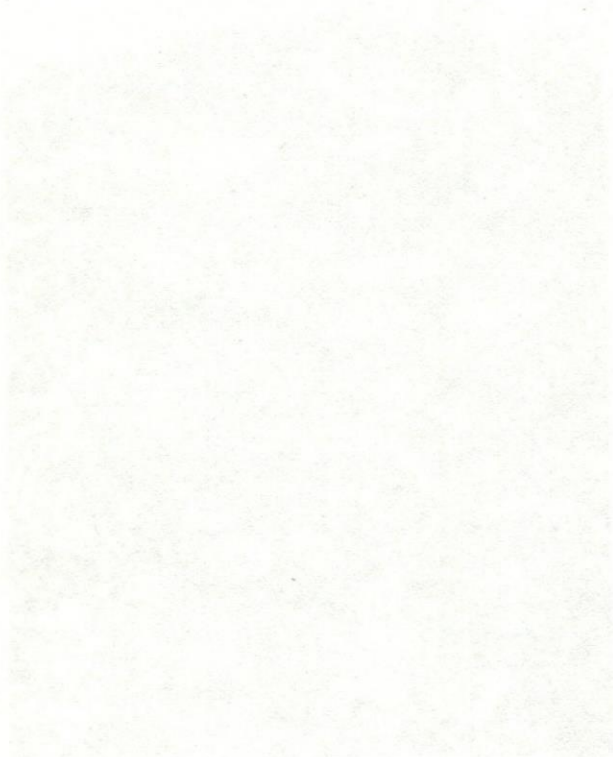


Fig. (2): Basophilic degeneration of the papillary muscles of the heart (x 400).



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