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KHAT AND CONGENITAL ABNORMALITIES

PROF. ABDEL HALIM KAMEL, DR. EZZ ELDIN SAID HUSSAIN AND
ELSAYED MOHAMMED HAMMOUDA

Faculty of Science, Am Shams University, Cairo, U.A.R.

KHAT addiction is still a problem in Yemen and other Arab countries. The problem was brought to the attention of the W.H.O. Commission on narcotic drugs in 1956, since then it had been discussed at successive sessions.^{1,2} The question to be answered was whether Khat had the ill-effects comparable to those drugs under international control, or whether it is completely harmless and does not warrant any international action. The Commission came to the conclusion that nothing could be done until the medical aspects of the problem are studied. That study had not yet been undertaken because the chemical and the pharmacological identification of the active ingredients of Khat had not been encountered.

It is due to this point that the idea arose to investigate the effects of the crystalline Khat alkaloids on the developing chick embryo hoping to start a series of research work that would justify appraising Khat as a harmful drug.

To 25 gm. finely ground Khat leaves, 70 ml. ether and 35 ml. chloroform were added. The dried leaves were shaken and then allowed to stand for 10 minutes. 5 ml. of diluted ammonium hydroxide were added and shaking was continued for 6 hours followed by extraction for further 6 hours with the same solvent. The filtrate was extracted thrice with 10 ml. portions of Normal sulphuric acid. The acid extract was left to evaporate at room temperature. White needle-like crystals were then obtained, these were recrystallised from ethanol, dried, weighed and used as such for the purpose of the present experiments.

White Leghorn fertilized eggs were injected with $\frac{1}{2}$ c.c. distilled water containing 10 mgm. of crystalline Khat extract after 24 hours incubation. The eggs were then re-incubated for further 24, 48 and 72 hours before sacrificing the embryos.

Figure 1 shows a Khat extract-treated embryo aging 96 hours with monstrous phenotype. It is clear that nearly half the blastoderm had been degenerated. In this respect, Khat resembled colchicine which was found to cause the degeneration of a part of the blastodisk.³ The process of cranial flexure was stopped at a level of a more early stage of 43 hours. The cervical region of the embryo was prevented from further flexion, and persisted at the long axis of the embryo. The caudal flexion failed completely to start, thus the characteristic C-shape of similarly aged normal embryos was lost; an abnormal S-figure was acquired instead. This may be attributed to the complete paralysis of the posterior half of the embryo from performing any process of the positional orientation. The process of torsion could, however, take place in the anterior half of the body.

The prosencephalon (PROS.) could not differentiate into the diencephalon and telencephalon. Similarly, the mesencephalon (MES.) was not able to add to its wall the characteristic thickening. The rhombocephalon, however, could differentiate into the metencephalon (MET.) and myelencephalon (MY.) though it was reduced in size. The neural tube (NT.) took a zig-zag S-shaped pathway subsequent to the abnormal figure of the embryo. Of the special

sense-organs, the eye (EYE) and the auditory vesicle (AU.V.) could make feeble appearance but the olfactory pit was completely blocked.

Khat also retarded the development of the heart of this embryo to a stage corresponding

The body musculature was likewise affected by the extract; only 30 paired mesodermal somites (MES.S.) could be traced at this stage. Moreover, the extract prevented the appearance of the limb buds.

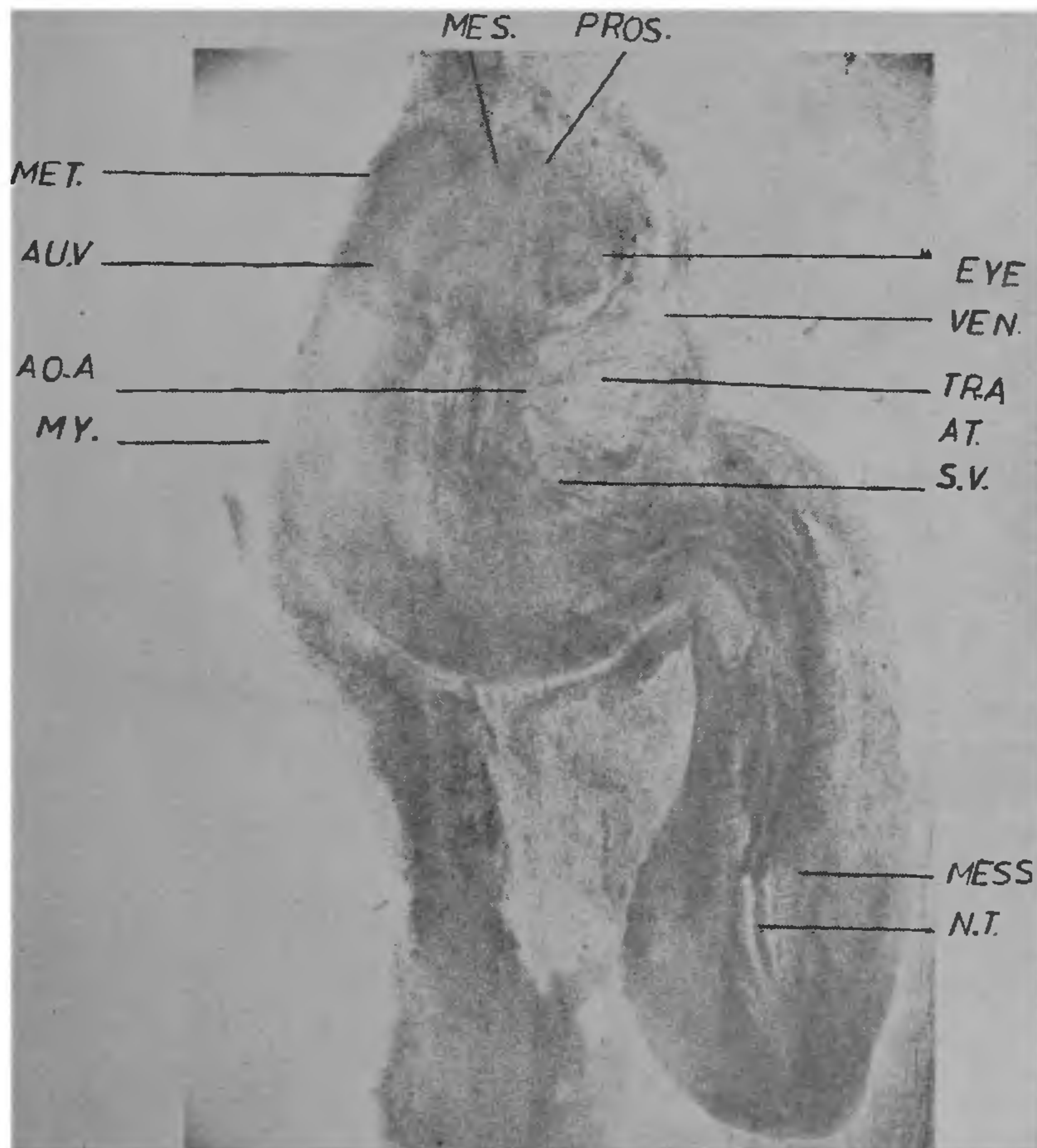


FIG. 1

to 55 hours. The truncus arteriosus (TR.A.) arose at a relatively retarded cone-like structure. The ventricle (VEN.) got twisted on itself forming a retarded U-shape in an abnormally horizontal plane. The sinus venosus (S.V.) was still represented by paired primordia where the common cardinals are supposed to enter the omphalomesenteric veins.

Further details of the effect of Khat on the early stages of the chick embryo will be reported later.

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