

Ectopic Fetal Adrenal Cortex in the Lung of a Newborn

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Summary. A case of ectopic fetal adrenal cortex in the lung of a newborn is reported. Cytomegaly was present in the ectopic as well as in the normally situated adrenal tissue. The literature and the presumed embryological origin of this anomaly are reviewed.

Introduction

Ectopic adrenal tissue is a frequent finding in the subdiaphragmatic regions of young children. Above the diaphragm it is extremely rare: only three cases in adults (Kohn, 1899; Meyer, 1917; Wiener and Dallgaard, 1959) and one in a child (Potter, 1952) have been reported thus far.

The present report describes the case of a newborn with ectopic fetal adrenal cortex in the superior lobe of the right lung complicated by cytomegaly of the ectopic and of the normally situated adrenal glands.

Case Report

This newborn girl was delivered by cesarian section carried out at term because of frontal presentation and of fetal distress due to cord compression. The amniotic fluid was stained with meconium. She weighed 3620 g at birth. After birth, a slight cyanosis persisted despite repeated external manipulations and controlled ventilation.

The child was found dead in her crib 48 hours after birth. The mother, aged 25 years, gravida I, para I, presented nothing unusual. The pregnancy proceeded normally, except for weak fetal movements.

Autopsy disclosed bilateral pulmonary atelectasis, slight aspiration of noninfected amniotic fluid, bilateral cytomegaly of adrenal cortex, and ectopic fetal adrenal cortex with cytomegaly in the superior lobe of the right lung. The lungs weighed 59.4 g and were firm and reddish purple with scattered pale pink regions on the external and on the cut surfaces. Pulmonary fluid was abundant and heavily stained with blood. Partial and total pulmonary docimasia were positive. The ectopic adrenal tissue was not detectable grossly.

The lungs were fixed in 10% neutral formalin and the sections stained with hematoxylin and eosin, Van Gieson, Gömöry for reticulin, and Verhoeff for elastin.

Microscopically, in the superior lobe of the right lung there was a nodule measuring about 400 μ in diameter and made up of fetal cortical adrenal tissue. This nodule was situated in a lobular septum close to a bronchus and its accompanying blood vessels (Fig. 1). It was well circumscribed and apparently encapsulated by a thin layer of fibrous connective tissue. It was partly surrounded by pulmonary parenchyma and partly by a broncho-vascular septum. A few capillaries emerged from the latter and penetrated into the nodule. Most of the central part of the nodule was composed of large clearly delineated cells of about 15–20 μ (Figs. 2, 3). The abundant cytoplasm of the cells was generally strongly eosinophilic, sometimes finely vacuolated or finely granular. The nuclei were oval, bigger than those of normal adrenal cortex and moderately rich in chromatin. Among these cells there were big

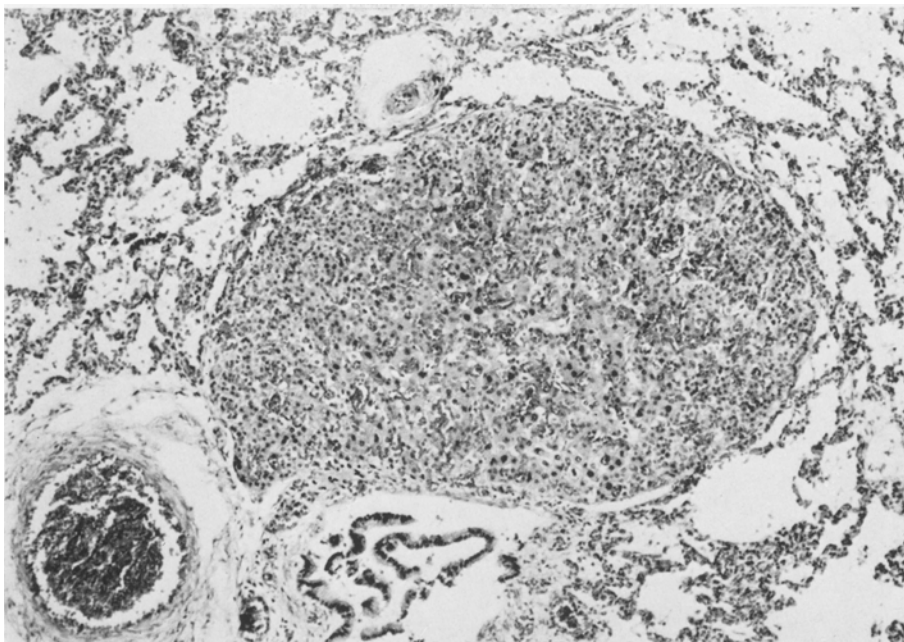


Fig. 1. Heterotopic adrenal cortical nodule embedded in a lobular septum of the right lung close to a bronchus and blood vessels. H.E. $\times 80$

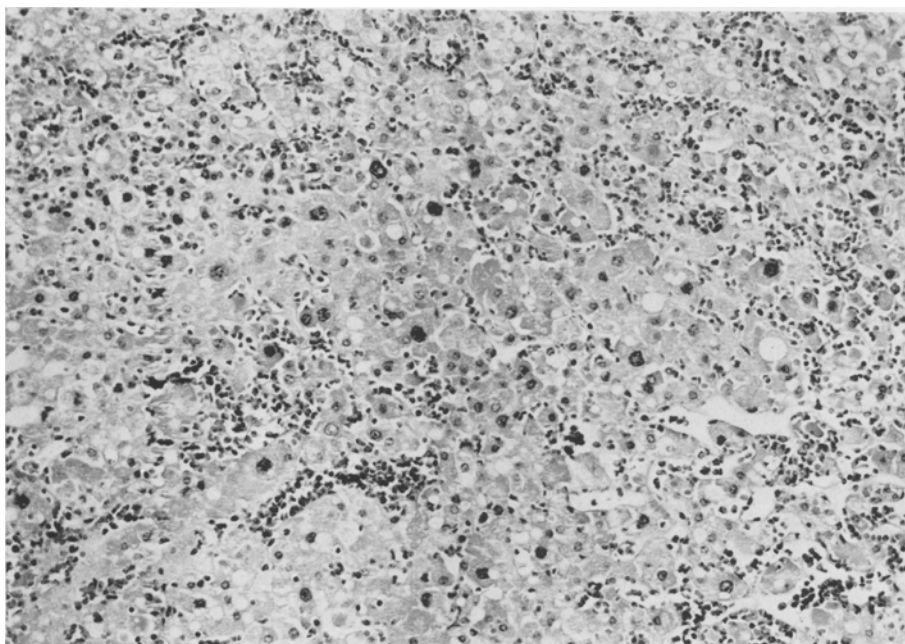


Fig. 2. Central portion of the nodule composed of fetal adrenal cortical cells some of which are cytomegalic. H.E. $\times 130$

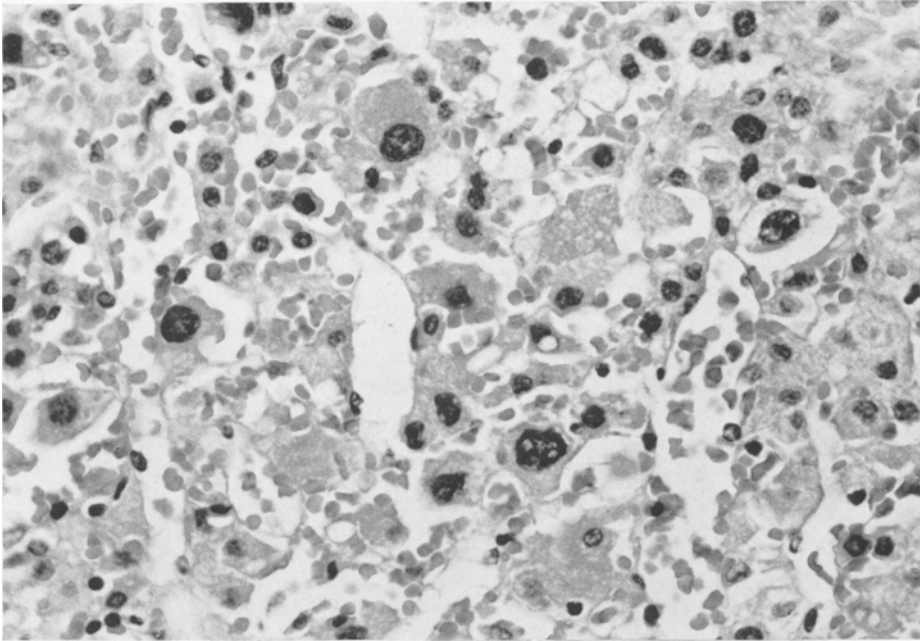


Fig. 3. Thin section of central portion of nodule showing numerous cytomegalic cells. Toluidine blue $\times 450$

cytomegalic ones, measuring 30–35 μ , with large single polymorphic nuclei rich in chromatin. The cells located in the central part of the nodule formed thick trabeculae which were loosely arranged in a somewhat perpendicular fashion with respect to those at the periphery. The trabeculae were separated by capillaries many of which were dilated and filled with blood. Toward the periphery of the nodule many of the cells were much smaller with relatively scanty and slightly basophilic cytoplasm and small hyperchromatic nuclei suggesting beginning differentiation of the fetal toward the adult cortex.

After histological demonstration of the ectopic adrenal tissue, the paraffin block containing the nodule was deparaffinized and re-embedded in Epon 812. Thin sections ($< 1 \mu$) stained with toluidine blue, allowed one to better visualize the findings described above (Fig. 3).

Discussion

The only prior case of presumed supradiaphragmatic ectopic adrenal tissue in a child was described by Potter in 1952. She observed in the lung of a newborn child small areas of tissue resembling the innermost portion of the fetal adrenal cortex. In the adult, three cases of intracranial ectopic adrenal gland including cortex and medulla, have been reported (Kohn, 1899; Meyer, 1917; Wiener and Dallgaard, 1959).

In our case, the histological appearance of the pulmonary nodule described above can be best interpreted as that of fetal adrenal cortical tissue. This nodule, being an incidental histological finding after formalin fixation and paraffin embedding, prevents us from confirming its nature by means of electron microscopy and histochemistry. Nevertheless, the simultaneous presence of cytomegaly

in the nodule and in the two normally situated adrenal glands lends support to our interpretation.

The origin of ectopic adrenal cortex remains a matter of speculation. In our opinion, the presence of ectopic fetal adrenal cortex in the lung could be related embryologically to misplaced mesothelial cells. At about the 5th week of embryonal life, mesothelial cells located between the root of the mesentery and the primitive gonadal tissue begin to proliferate and penetrate the underlying mesenchyme. There they differentiate into the large eosinophilic elements which form the fetal cortex of the adrenal gland (Langman, 1972). Since peritoneum and pleura have the same mesodermal origin as the adrenal gland, it is conceivable that the primitive pleural mesothelium which lies between the ramifications of the buds of the bronchial tree could give rise to ectopic fetal adrenal cortical tissue above the diaphragm.

Another possibility is that of autonomous differentiation of mesodermal elements as suggested by Watzka (1956) to explain the presence of ectopic adrenal cortical tissue in the testicle of a child.

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