Ultraviolet-Photographical and Ultrastructural Observations on Swine Ovarian Haemangioma

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Haemangioma is a benign tumour of endothelial cells [7] and it is difficult to distinguish between benign angiomatous neoplasia and vasoformative hamartomas [8]. Although there have been several reports of ovarian haemangioma in the pig [1, 2, 6], the lesions were examined only grossly or by light microscopy. This paper describes two cases of swine ovarian haemangioma which were observed by ultraviolet photography and electron microscopy.

Case 1 was a 5-year-old Duroc sow. She has been delivered of piglets five times. Case 2 was a 5-year-old Duroc sow which has been delivered of piglets nine times. They were killed because of low fertility.

Tumours were grossly found only in the ovaries and collected for microscopy. Tissues were fixed in 10% formalin, processed by standard methods and embedded in paraffin. Sections were stained with haematoxylin and eosin (HE). Formalin-fixed tissues were also used for electron microscopy. After initial fixation, the tissues were post-fixed in 1% osmium tetroxide and treated routinely. Formalinized tissues were observed by ultraviolet photography using UV-Nikkor 105 mm F4.5 S lens and Nikon UV filter with high percentage transmittance of long wave ultraviolet, particularly the 330 nm line of the mercury spectrum.

In Case 1 there were tumour masses in the bilateral ovaries. The masses in the right ovary measured 4.5×3.5×2.5 cm and 2.6×2.5×2.5 cm

Fig. 1. The cut surface of the right ovary and neoplastic masses (bottom). Visible light photograph. Bar=7.2 mm.

Fig. 2. A netty appearance of the neoplastic masses is seen in detail. Corpora luteum look dark and corpus albicans (arrow) and follicles are obvious. Ultraviolet photograph. Bar=7.2 mm.
and the mass in the left ovary measured 10.0×7.5×4.5 cm. These masses were firm, spherical to oval in shape, and well circumscribed. On cut section the tumours in the right ovary were relatively homogeneous with dimly dense areas on conventional photography with white light exposure (Fig. 1). But they looked peripherally dark and centrally light with a netty appearance and surrounding connective tissues were apparent on ultraviolet photography (Fig. 2). The cut surface of the left tumour resembled the periphery of the right tumours and was mostly dark on ultraviolet photography. Corpora luteum, corpora albicans and Graafian follicles were observed in both ovaries and were distinctly distinguishable on ultraviolet photography. The corpora luteum were darker than tumours and the latter two were light.

In Case 2 the left ovary had a 2.0×1.8×1.5 cm firm nodular mass, whose cut surface revealed the same manner as in the left tumour in Case 1.

On optical microscopy, the central area of the right tumours in Case 1 showed a cavernous haemangiomatous growth having dilated vascular spaces and a single layer of flattened endothelial cells. The vascular spaces were empty or filled with erythrocytes. These neoplastic vessels were separated by well-developed collagenous stroma.

In the peripheral area the neoplasm consisted of an accumulation of capillary vessels and some scattered large vessels with a single layer of endothelial cells. Similarly the masses in the left ovaries of Case 1 and Case 2 had nodular growths of capillary haemangioma cells and some sinusoidal vessels admixed with them. The red blood cells were relatively abundant in the neoplastic capillary.

The ultrastructure of haemangioma cells was the same in Case 1 and Case 2. The neoplastic cells were arranged regularly in most vessels (Fig. 3), but sometimes not in the capillary haemangiomatous lesions. The neoplastic cells frequently had irregular nuclear contours with small nucleoli (Fig. 4). Some mitochondria and rough endoplasmic reticulum with occasional dilatation were present in the cytoplasm. The primary and secondary lysosomes were frequently observed and plasmalemmal vesicles were not abundant. Numerous cytoplasmic microfilaments were present and fibrillary intranuclear inclusions were rarely found (Fig. 5). The luminal surfaces were mostly smooth but partly lined by the microvillous projections. Tight junctions were seen between adjoining cells (Fig. 6) and basement laminar material was continuous or interrupted. Pericytes showed less development of the organelles.
Internal ultraviolet ranging from 300 to 380 nm in wave length is well absorbed by porphyrin, carotenoid, flavin, pterin and so on [3]. In our cases the haemangiomatous lesions with many red blood cells looked dark on ultraviolet photography using internal ultraviolet, because red blood cells contain haemoglobin in which protoporphyrin is present as a component. Similarly corpora luteum looked very dark owing to much lutein which is a carotenoid. Protein absorbs few internal ultraviolet rays [3]. The stromal and surrounding connective tissues took white in the ultraviolet photographs, since these tissues are mostly composed of collagenous fibres which is a kind of protein. Corpora albicans with developed connective tissues also revealed a similar impression. The ultraviolet photography may be useful in observing hyperaemic or haemorrhagic foci, pigmented tissues and connective tissues.

A case of multifocal hamartomatous haemangioma in a pig has been reported [9] and ovarian haemangioma was also considered to be a vascular hamartoma [4]. On the other hand, Hsu [2] examined swine ovarian haemangiomas and suggested that these tumours arisen from the vessels of the corpus lutea in the old sows. Two sows in our study have been delivered of piglets many times. In man, most of haemangiomas are tumour-like malformations present at birth or childhood and their ultrastructures were fundamentally the same as those in normal vessels [5]. Lysosomes, irregular nuclear contours and fibrillar intranuclear inclusions detected in our cases are not common in normal vessels. The age and ultrastructures support that ovarian haemangioma is a true neoplasm rather than hamartoma.

REFERENCES

要約

紫外線撮影および電子顕微鏡による豚の卵巣血管腫の観察（短報）：安藤義路，横木勇逸，門田耕一（農林水産省家畜衛生試験場）——5歳のデュロック種，豚2頭の卵巣に，海棉状または毛細血管性の血管腫が認められた。紫外線写真では普通写真に比べ，腫瘍組織と卵巣組織の構造がより明確であった。腫瘍細胞の超微形態から，卵巣血管腫は過誤腫よりもむしろ真の腫瘍であることが示唆された。