

Case Report:

Malignant Teratoma in a Domestic Fowl (*Gallus gallus domesticus*)

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ملخص البحث

تم تشخيص ورم مسخي خبيث في مبيض دجاجة عمرها 14 شهرا من سلالة الليجهورن الأبيض 0 شملت الآفات الظاهرة إحتواء المبيض علي عقيدات كبيرة الحجم وكما لوحظ وجود عقيدات صغيرة الحجم في أغشية الأعضاء الحشوية شملت التامور والمعدة الهاضمة والقانصة والرئة والكلية والأمعاء. النسيج المكون للعقيدات المبيضية والعقيدات الحشوية احتوى علي أدمة ثلاثية التكوين. أكد خبائة الورم المسخي إنتشار الورم ووجود نسيج جنيني غير مميز وأشكال للانقسام الفتيلي.

Summary

Malignant ovarian teratoma was diagnosed in a 14-month-old White Leghorn hen. Grossly, the ovaries contained large solitary nodules. Small nodules were also observed on the serosa of the visceral organs, viz pericardium, proventriculus, gizzard, lung, kidney and intestine. Both the ovarian nodules and the visceral ones showed the tridermic histological feature of teratoma. Malignancy was evidenced by metastasis of the tumour, presence of undifferentiated embryonic tissue and mitotic figures.

Introduction

Teratomas are tumours derived from multiple germ cell layers and are uncommon in animals (Moulton, 1978) and Man (Baker *et al.*, 2006). Spontaneous teratomas in the domestic fowl (*Gallus gallus domesticus*) are rare and most cases are benign (Campbell, 1969; Helmboldt *et al.*, 1974). They are usually found in the gonads but extragonadal sites have been reported (Homer and Riggs, 1991; Williams *et al.*, 2001). The present report describes a rare malignant teratoma in a domestic fowl.

Clinical features and gross findings

A 14-month-old white Leghorn hen was brought alive to the Central Veterinary laboratory with an enormously distended belly. At necropsy, the body of the hen was emaciated and the abdominal cavity was filled with clear, yellowish-brown serous fluid. The most striking gross lesion was multiple tumescence; variable in shape and about 0.5-2cm in diameter, attached to the serosal surface of the pericardium,

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These swellings were inconsistently soft, pale red and the cut surface had a pale fleshy appearance. The ovary was also involved and manifested large solitary nodules that replaced most of the pre-existing ovarian follicles. Specimens collected from the nodules and attached organs were divided into two portions. One part was freshly sectioned using cryostat and stained with Sudan III. The second part was fixed in 10% formalin, embedded in paraffin and sectioned 4-6 μm thick by the rational method and stained with haematoxylin and eosin, Masson's trichome connective tissue stain and Youb-Shklar method for Keratin and prekeratin.

Results

Histological Findings:

Sections revealed disorderly arranged various tissue and structures including squamous epithelium, cartilage, bone and adipose tissue, in varying degree of maturity, which were embedded in sarcomatous undifferentiated embryonic mesenchyma.

The epithelial cells were predominant and occurred in various forms. Papillary projections lined by cuboidal or columnar cells were regularly encountered together with ducts or acini which were irregular in size and lined by single or multiple layers of cuboidal cells (Fig.1). Keratinized stratified squamous epithelium coexisted with a land of epithelial cells, was detected (Fig. 2). Structures resembling uropgial gland were observed. Irregular cysts lined by flattened epithelial cells were commonly seen; many of them were filled with granular eosinophilic material. These epithelial cells had scanty, poorly distinguished basophilic cytoplasm, and polymorphic nuclei. Many of these nuclei showed rarefaction of the nucleoprotein. The nucleoli were not prominent and the mitotic figures were moderate.

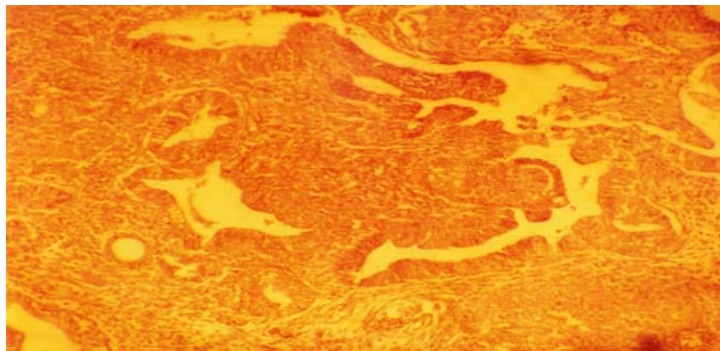


Fig.1: Ovarian teratoma. Note papillary projection and irregular size glandular structures (H & E x10).

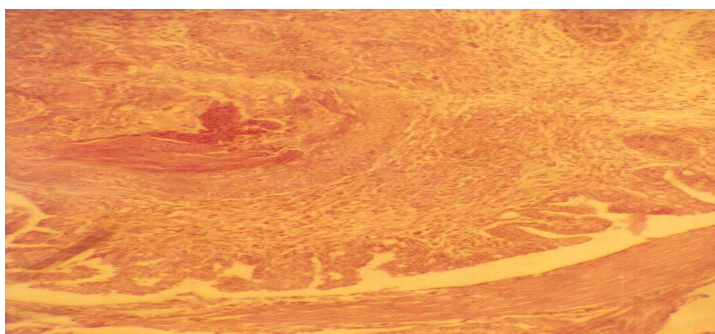


Fig. 2: Ovarian teratoma: Note stratified squamous epithelium with keratinized layer, muscle, upper right (H & Ex10).

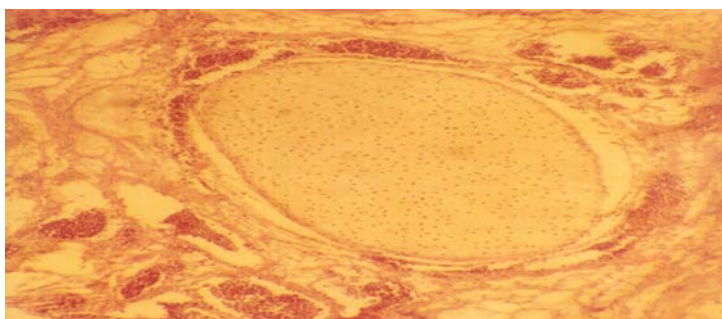


Fig.3: Intestinal teratoma: Not, cartilage and extravasated erythrocytes

Discs of hyaline cartilage occurred within the tumour together with osteous tissue and undifferentiated mesenchymal elements (Fig. 3). Fat, smooth muscle and fibrous tissue were distributed in the tumour. Haemorrhages and necrosis were encountered. Apart from the visceral serosa and submucosa of the intestine, metastatic lesions were not seen.

Discussion

The tumour described in this report showed a typical histological feature of teratoma (Smith *et al.*, 1972). These findings do not differ from those previously reported in the domestic fowl (Narayana *et al.*, 1966; Baker and Candler, 1981).

It appears that the primary growth had arisen from the ovary, which is considered to be the commonest location for this type of tumour (Feldman and Olson, 1965; Campbell and Appleby, 1966; Narayana *et al.*, 1966; Smith *et al.*, 1972; Rao *et al.*, 1975), which

metastasized to the serosal surface of liver, kidney, lung, pancreas, pericardium and other organs; these findings may contradict those of Kajigaya *et al.* (1987) who showed that the cellomic membranes and their structure in hens retard the spread of cancer by functioning as a barrier against direct spread of cancer cells.

In human pathology the histogenesis of teratomas has been a matter of dispute. According to one theory, these tumours arise from germ cells as they are most often located in the gonads. The other theory asserts their origin from multi-potential embryonic cells that are displaced during oncogenesis. Damjanou and Solter (1976) have indicated that mature cystic teratoma could arise from both germ and embryonic displaced cells. Supporting evidence for germ cell origin of this tumour, was obtained from Karyotypic analysis of its sex chromosome content. Teratomas of female are XX, whereas 50 % of those in male are XX and the remainder XY; this correlates with sex chromosomes distribution of the germ cells of the two sexes (Underwood, 1998). The multiple involvements of the tumour compared to the age of the hen may support its embryonic origin.

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References

- Baker, J. R. and Candler, D. J. (1981).** *Vet. Rec.*, **109**:60.
- Bakker, M. A. D.; Ansink, A. C. and Ewing-Graham, P. C. (2006).** *J. Clin. Pathol.*, **59**:658-660.
- Campbell, J. G. (1969).** *Tumour of the fowl*. 2nd edn, William Heinemann Medical Book Ltd, London. P.257-271.
- Campbell, J. G. and Appleby, E. C. (1966).** *J. Pathol. Bacteriol.*, **92**: 77-90.
- Damjanov, I. and Solter, D. (1976).** *Am. J. Pathol.*, **83**: 241-244.
- Feldman, W. H. and Olson, C. (1965).** Neoplastic disease in chicken. In: Blester, H. E. and Schwartz, L. H. (eds) *Diseases of poultry*. 5th edn., Iowa State, USA. Pp. 912-924.
- Helmoboldt, C. F.; Migaki, G.; Langheinrich, K. A. and Jakowski, R. M. (1974).** *Avian Dis.*, **18**:142-148.
- Homer, B. L. and Riggs, M. W. (1991).** *Avian Dis.*, **35**:994-998.
- Kajigaya, H.; Kamemura, M.; Tanahara, N.; Ohta, A.; Suzuki, H.; Sugiyama, M. and Isoda, M. (1987).** *Avian Dis.*, **31**:176-186.

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- Moulton, J. E. (1978).** *Tumour in domestic animals*, 2nd edn, California, USA. Pp. 317-318 & 330.
- Narayana, J. V.; Rao, P. R.; Hristopher, C.; Rao, K. J.; and Sastri, G.M. (1966).** *Indian Vet. J.*, **43**:119.
- Rao, A.G.; Rao, A.T. and Nayak, B.G. (1975).** *Indian Vet. J.*, **52**:955.
- Smith, H.A.; Jones, T.G. and Hunt, R.D. (1972).** *Veterinary Pathology*. 4th edn, Lea and Febiger, Philadelphia, USA., P. 270.
- Underwood, J. C. E. (1998).** *Carcinogenesis and Neoplasia. General and Systematic Pathology*. 2ndedn. Churchill Livingstone, Edinburgh, UK., Pp. 245-291.
- Williams, B.H.; Yantis, L.D.; Graig, S.L.; Geske, R.S.; Li, X. and Nye, R. (2001).** *Vet. Pathol.*, **38**:328-331.