Uterine adenocarcinoma with transcoelomic metastases in breeder hens (Gallus domesticus)

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ABSTRACT
Hens involved in a Newcastle disease study were euthanased at regular intervals according to a designed protocol. Of these, 7.14 % (n = 42) of the 82-week-old specific pathogen-free breeder hens were found to have well-delineated firm white to yellowish nodules of varying sizes in the abdominal cavity. Histologically, the nodules were identified as an adenocarcinoma originating in the uterus. Transcoelomic spread was evidenced by the presence of similar neoplastic cells embedded in the serosa and outer longitudinal muscle layer of the intestines as well as the liver.

Keywords: adenocarcinoma, hens, uterine tumour.

INTRODUCTION
Tumours in commercial poultry are mostly caused by infection with avian herpes, leukosis and retroviruses and thus most studies on avian tumours have been focused on those with viral aetiology, probably due to their economic importance and also because they serve as a model for human cancer studies.

Adenocarcinomas in poultry are among the groups of tumours of unknown aetiology, and have been reported by several veterinary pathologists and reviewed.

The term adenocarcinoma or peritoneal carcinomatosis has been applied to tumours whose origin cannot be ascertained but that spread widely over the peritoneum and other visceral organs and are frequently observed in aged hens. Spontaneous neoplasms or adenocarcinomas affecting various organs have been reported in specific pathogen-free (SPF) hens and most of these tumours are thought to originate in the oviduct or ovary. A study in Irish abattoirs reported 419 birds with nodules, 80.4 % of which were tumours, and 71.8 % of the tumours were adenocarcinoma of the intestine and reproductive tract. A prevalence of 5–81 % for oviductal adenocarcinomas in end-of-lay hens and 92.9 % for ovarian and oviduct adenocarcinomas in 305 4-year-old layers has been reported.

Generally, information on the incidence of nonviral tumours in commercially raised chickens and turkeys is limited, probably due to their shorter life span than that required for the development of such tumours. Also, there are few reports of tumours that are not virally induced because structured surveys are not conducted to assess the situation as they are generally perceived as incidental conditions. Nonviral tumours are also probably considered to be of less economic importance. The present communication reports cases of uterine adenocarcinoma in SPF breeder hens (Gallus domesticus) encountered during an experimental virus challenge study.

MATERIALS AND METHODS
Forty-two commercial Hyline Brown layers (52 weeks old) and 42 SPF White Leghorn breeder hens (82 weeks old) selected for a Newcastle disease vaccine trial were randomly assigned into 8 groups. Birds were then vaccinated with La Sota vaccine after acclimatising for 2 days and subsequently challenged 10 days later with a virulent isolate of Newcastle disease virus belonging to lineage 5d/VIIId. Eight birds (4 SPF and 4 commercial) were euthanased on days 2, 4, 6, 8 and 10 post-vaccination and post-challenge. The euthanised birds were necropsied and various organs required for the trial were collected. The organs with nodules encountered at necropsy were also sampled. Gross findings were recorded and samples of the organs including those with nodules were preserved in 10 % neutral buffered formalin, trimmed and then routinely processed and stained with standard haematoxylin and eosin (H&E) and then examined by light microscopy.

RESULTS
All the birds were in a relatively good bodily condition throughout the trial. Two of the hens euthanased on day 2 post-vaccination and another 1 euthanased on day 6 post-challenge, however, had prominent keel bones and shrunken breast muscles. The coelomic cavity of all 3 hens was filled with firm white to yellowish growths of varying sizes. The nodules were found on the oviduct, pancreas, liver, heart, spleen, proventriculus, intestines and the mesentery (Figs 1 & 2). There were adhesions between the various organs and especially between the intestinal loops. The intestinal mesentery was also extensively involved resulting in clumping of the intestine. The follicles were inactive with no mature or developing ova and the oviducts were small, flaccid and non-functional.

Microscopically, the uterine changes were characterised by transmural branching cords and sheets of neoplastic cells. Indications of acinus/tube formation were also present within these aggregates of neoplastic cells (Figs 3 & 4). The neoplastic cells had medium to large vesicular nuclei with a single nucleolus and moderate amounts of grey, finely granular cytoplasm. The mitotic index was low. Marked fibroplasia (scarious reaction) was found surrounding the acinar structures (Figs 3 & 4). Transcoelomic spread was evidenced by the presence of similar neoplastic cells embedded in a prominent fibrous stroma abutting the serosa and outer longitudinal muscle layer of the intestines as well as on the capsule of the liver. The glandular origin of the neoplasm was much more evident in the metastatic foci, with tubule and acinus formation being prominent. There was no evidence of neoplasm in the ovarian and magnum tissues.
DISCUSSION

These cases were diagnosed as uterine adenocarcinoma with transcoelomic metastases based on the histological morphology of the uterine neoplasm. The neoplasm was characterised by branching cords and sheets of cells infiltrating between the smooth muscle bundles of the uterine wall. These changes were absent in the magnal tissue and ovary. Metastatic abdominal adenocarcinomas may originate from either the ovary or the oviduct and their differentiation may be difficult. In these cases the absence of neoplastic cells in the ovarian and magnal tissues confirms the site of origin as uterine in nature. According to a previous report, most adenocarcinomas of the oviduct originate in the upper magnal portion of the oviduct, but occasional cases of adenocarcinomas do occur in the shell gland (uterus) and infundibulum. Although this was not a structured research study, the prevalence of 7.14% recorded agrees with previous findings of a prevalence rate of 5–81% for oviductal adenocarcinoma.

These adenocarcinomas were encountered in 82-week-old White Leghorn hens, which tallies with the reviewed published findings that ovarian and oviductal adenocarcinomas are among the most frequently encountered tumors in older White Leghorn hens. The SPF birds used in the study had been laying eggs for approximately 62 weeks and prolonged reproductive activity and ageing has been suggested to have a direct relationship to the occurrence of oviductal adenocarcinomas in fowl, presumably because the high egg production is associated with continuous gonadotrophin production, resulting in the excess stimulation of oestrogen-sensitive target organ epithelium.

In conclusion, neoplastic diseases, irrespective of their aetiology or the organ affected, cause economic loss and therefore the recording and reporting of these diseases remain vital.

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REFERENCES


4. Fredrickson T N 1987 Ovarian tumors of the hen. Environmental Health Perspectives 73: 35–51


