

This may be the first case report describing a virus-associated spontaneous neoplasm in the central nervous system of an animal.

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References

- BELMONTE, V. (1935) Über ein Gliom beim Haushuhn. *Virchows Archiv für Pathologische Anatomie und Physiologie und für Klinische Medizin* **294**, 329-333
- BIERING-SØRENSEN, U. (1956) On disseminated, focal gliomatosis ('multiple gliomas') and cerebral calcification in hens. A study of pathogenesis. *Nordisk Veterinær Medicin* **8**, 887-901
- ERICHSEN, S. & HARBOE, A. (1953) Toxoplasmosis in chickens. *Acta Pathologica et Microbiologica Scandinavica* **33**, 381-386
- FREDRICKSON, T. N. & HELMBOLDT, C. E. (1991) Tumors of unknown etiology. In *Disease of Poultry*, 9th edn. Eds B. W. Calnek, H. J. Barnes, C. W. Beard, W. M. Reid, H. W. Yoder, Jr. Iowa, Iowa State University Press. pp 459-470
- JACKSON, C. (1954) Gliomas in the domestic fowl. *Onderstepoort Journal of Veterinary Research* **26**, 501-597
- JUNGHERR, E. & WOLF, A. (1939) Gliomas in animals: a report of two astrocytomas in the common fowl. *American Journal of Cancer* **37**, 493-509
- LUGINBÜHL, H., FANKHAUSER, R. & McGRATH, J. T. (1968) Spontaneous neoplasms of the nervous system in animals. In *Progress in Neurological Surgery*, Vol. 2. Eds H. Krayenbühl, P. E. Maspes, W. H. Sweet. Chicago, Year Book Medical Publishers. pp 85-164
- PAYNE, L. N. & PURCHASE, H. G. (1991) Leukosis/sarcoma group. In *Disease of Poultry*, 9th edn. Eds B. W. Calnek, H. J. Barnes, C. W. Beard, W. M. Reid, H. W. Yoder, Jr. Iowa, Iowa State University Press. pp 386-439
- SILVA, R. F. & WITTER, R. L. (1996) Correlation of PCR detection of MDV with the appearance of histological lesions. In *Current Research on Marek's Disease*. Eds R. F. Silva, H. H. Cheng, P. M. Coussens, L. F. Lee, L. F. Velicer. Pennsylvania, American Association of Avian Pathologists. pp 302-307
- SUMMERS, B. A., CUMMINGS, J. F. & de LAHUNTA, A. (1995) Veterinary Neuropathology. St Louis, Mosby-Year Book. pp 351-401
- SWAYNE, D. E. (1996) Nervous system. In *Avian Histopathology*, 2nd edn. Ed C. Riddle. Pennsylvania, American Association of Avian Pathologists. pp 183-201
- WIGHT, P. A. L. & DUFF, R. H. (1964) The histopathology of epizootic gliosis and astrocytomata of the domestic fowl. *Journal of Comparative Pathology* **74**, 373-380



FIG 1: Nine-month-old Holstein calf showing thickening of the skin and multiple mast cell tumour nodules distributed over the skin. Some of the nodules are ulcerated

such as lymph nodes, mesenterium, liver, abomasum, lung or heart (Head 1958, Groth and others 1960, Migaki and Carey 1972, Stephens and Mullowney 1986, Hill and others 1991). Only visceral presentations have also been reported (Hill and others 1991). No sex or breed predilection has been observed and mast cell tumours occur more frequently in mature animals (Head 1958, Pulley and Stannard 1990, Hill and others 1991), although cases have been reported in calves as young as two weeks (Dodd 1964). In this study, a case of multiple cutaneous mast cell tumours in a newborn calf is described, which is, to the authors' knowledge, the first report of this tumour in a cow in Spain and one of the few in Europe.

A newborn Holstein female calf presented with several nodular thickenings, about 3 cm in diameter, over the skin of the head. During the first days of its life, these nodules extended to involve the neck and, after a few weeks, they appeared over the entire body surface, particularly in the flanks (Fig 1). The nodules were alopecic, non-pruritic, painless, firm to the touch and immovable. The largest were up to 12 cm in diameter and some of them appeared ulcerated and showed a serous or haemorrhagic discharge. The calf was euthanased on welfare grounds when it was nine months old. At this time, most of the skin surrounding the nodules had become thicker than usual (Fig 1), but the lesions did not cause severe clinical signs except for a slight weight loss and discomfort which was noticed during the final weeks of life. No other changes in the animal's behaviour or health status were observed, and the rest of the cattle on the farm were not affected. Serological tests to investigate the presence of antibodies against bovine leukaemia virus were carried out and the result was negative.

Postmortem studies were performed and no evidence of neoplasia was found in any of the organs examined, except the skin. Cutaneous samples from the head, flanks and the back were taken and fixed in 10 per cent neutral buffered formalin, processed routinely to paraffin wax, cut at 4 µm and stained with haematoxylin and eosin (HE) and toluidine blue.

Microscopically, the neoplastic masses were well-demarcated and non-encapsulated. The tumorous cellular infiltrate had distinct borders and extended from the hypodermis up to, but not into, the epidermis. The collagen dermal fibres were separated due to the presence of neoplastic cells forming sheets or small clusters, and focal areas of collagen degeneration were occasionally seen. The predominant cells were rounded or ovoid, showing slight variation in size, with abundant cytoplasm and distinct boundaries (Fig 2). Nuclei were large, round or oval and centrally located (Fig 2) and mitotic figures were rarely seen. Many fine cytoplasmic granules were observed metachromatically stained with toluidine blue; however, these granules were barely visible by means of HE stain (Fig 2). A few eosinophils were present only in the periphery of the tumour. The large ulcerated lesions

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Multiple cutaneous mast cell tumour in a calf

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MAST cell tumours occur frequently in dogs and, to a lesser extent, in cats and horses, but are rare in other domestic animals (Head 1958, Pulley and Stannard 1990). Although there have been several single case reports dealing with mast cell tumours in cattle, it is thought that they represent less than 1 per cent of all cattle neoplasia (Hill and others 1991) and approximately 3 per cent of bovine cutaneous and subcutaneous tumours (Head 1958). The skin appears to be the most common site and although exclusive cutaneous presentations have been reported (McGavin and Leis 1968, Ames and O'Leary 1984, Hill and others 1991, Genovese and Schipp 1995), the majority of the tumours also involve other organs

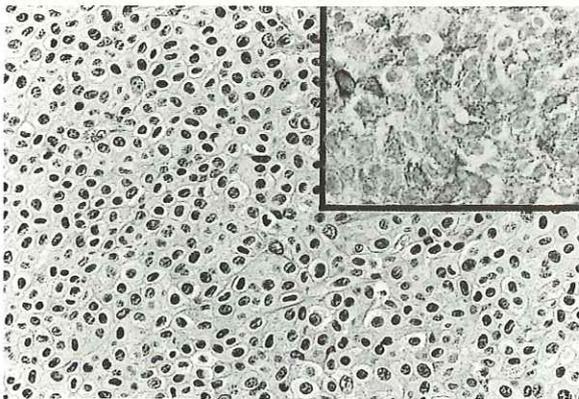


FIG 2: Rounded neoplastic cells, with abundant cytoplasm and large, round or oval nuclei. Haematoxylin and eosin $\times 400$. Inset: detail of the tumour showing fine cytoplasmic granules stained by toluidine blue $\times 600$

showed the same histological structure apart from the existence of a significant number of neutrophils together with some lymphocytes, macrophages and cellular debris associated with areas showing epithelium loss. According to Head (1958) and Pulley and Stannard (1990), these neoplastic masses were classified as mastocytomas, showing a multiple cutaneous presentation. The histological features were broadly consistent with those already described (McGavin and Leis 1968, Hill and others 1991, Shaw and others 1991, Genovese and Schipp 1995). However, in this case, the existence of cytoplasmic granules which were only clearly visible using toluidine blue stain, differs from other bovine cases in which granules were evident (Dodd 1964, Shaw and others 1991, Genovese and Schipp 1995). In dogs, a classification and grading system of I to III for canine mast cell tumours has been proposed, based on the degree of cellular differentiation: I being well differentiated to III meaning poorly differentiated (Pulley and Stannard 1990). In this case, the neoplasia could be likened to canine type II mast cell tumours (Pulley and Stannard 1990) based on the cellular morphology, the number of cytoplasmic granules and the presence of infrequent mitotic figures. The number of eosinophils was not very high whereas they formed an important cell population in other cases (McGavin and Leis 1968, Hill and others 1991, Shaw and others 1991, Genovese and Schipp 1995). Mast cell release factors are believed to be the cause of chemotaxis of eosinophils (Suter 1990); however, in canine mast cell tumours it has been stated that there is no acceptable explanation for the presence of eosinophils in this type of tumour, and an apparent correlation between the number of eosinophils and the degree of differentiation the neoplasia has not been found (Pulley and Stannard 1990). This statement would probably also be applicable to bovine mast cell tumours.

The most striking feature of this case was the age of the calf at presentation. Although mast cell tumours have been described in young cattle (Dodd 1964, Hill and others 1991), most of the reports concern adult animals (Head 1958, McGavin and Leis 1968, Stephens and Mallowney 1986, Hill and others 1991, Shaw and others 1991, Genovese and Schipp 1995). In this case, the neoplastic nodules were observed by the owner and the practitioner on the head of the calf just after birth, which suggests a possible congenital or very early development of the tumour, and a high individual susceptibility. Neither the mother nor other in-contact animals had shown tumoural growths.

The only organ involved in this calf was the skin, with a multiple presentation. This is in agreement with the majority of the other cases reported, in which the skin has been regarded as the most severely affected location (Head 1958,

Pulley and Stannard 1990, Hill and others 1991). The absence of grossly visible metastases, as in this case, has been previously reported (McGavin and Leis 1968, Hill and others 1991, Genovese and Schipp 1995), but involvement of the internal organs in addition to the skin, has commonly been found in most of the cases of bovine mast cell tumours reported previously (Head 1958, Migaki and Carey 1972, Pulley and Stannard 1990, Hill and others 1991). Severe clinical signs have been only reported in cases of internal organ involvement (Groth and others 1960, Stephens and Mallowney 1986), but when the tumour is restricted to the skin, there are no signs or there only appears to be slight discomfort (McGavin and Leis 1968, Genovese and Schipp 1995). Due to scarcity of reports of this type of tumour in cattle, little information about the possible causes and behaviour is available. Bovine leukaemia virus has been implicated in cows suffering from mastocytoma (Ames and O'Leary 1984, Shaw and others 1991) although no direct relationship between viral presence and neoplasia could be demonstrated. In this case, no evidence of infection with bovine leukaemia virus was found.

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References

- AMES, T. R. & O'LEARY, T. P. (1984) Mastocytoma in a cow: a case report. *Canadian Journal of Comparative Medicine* **48**, 115-117
- DODD, D. C. (1964) Mastocytoma of the tongue of a calf. *Veterinary Pathology* **1**, 69-72
- GENOVESE, L. M. & SCHIPP, R. J. (1995) Multiple cutaneous mast cell tumours in a cow. *Australian Veterinary Journal* **72**, 276-277
- GROTH, A. H., BAILEY, W. S. & WALKER, D. F. (1960) Bovine mastocytoma. A case report. *Journal of the American Veterinary Medical Association* **137**, 241-244
- HEAD, K. W. (1958) Cutaneous mast cell tumours in the dog, cat and ox. *British Journal of Dermatology* **70**, 389-408
- HILL, J. E., LANGHEINRICH, K. A. & KELLEY, L. C. (1991) Prevalence and location of mast cell tumours in slaughter cattle. *Veterinary Pathology* **28**, 449-450
- MCGAVIN, M. D. & LEIS, T. J. (1968) Multiple cutaneous mastocytomas in a bull. *Australian Veterinary Journal* **44**, 20-22
- MIGAKI, G. & CAREY, A. M. (1972) Malignant mastocytoma in a cow. *American Journal of Veterinary Research* **33**, 253-256
- PULLEY, L. T. & STANNARD, A. (1990) Tumors of the skin and soft tissues. In *Tumors in Domestic Animals*, 3rd edn. Ed J. E. Moulton. Berkeley, University of California Press. pp 23-87
- SHAW, D. P., BUOEN, L. C. & WEISS, D. J. (1991) Multicentric mast cell tumour in a cow. *Veterinary Pathology* **28**, 450-452
- STEPHENS, K. A. & MULLOWNEY, P. C. (1986) Disseminated mastocytoma in an Angus bull. *Compendium on Continuing Education for the Practicing Veterinarian* **8**, 307-310
- SUTER, M. M. (1990) Immunopathology. In *Mechanisms of Disease. A Textbook of Comparative and General Pathology*, 2nd edn. Eds D. O. Slauson, B. J. Cooper. Baltimore, Williams and Wilkins. pp 302-376

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