Melanocytic Cutaneous Lesions and Melanotic Regional Lymph Nodes in Slaughter Swine

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ABSTRACT

During a five month period, 220 slaughter swine (at two abattoirs) had gross cutaneous and lymph node lesions suggestive of melanoma. Lymph nodes from 214 and cutaneous lesions from 176 of these pigs were submitted for histological examination. Of the cutaneous lesions, 174 were spontaneously regressing melanomas, and two were nonregressing. Regression usually commenced by infiltration of the lesion by lymphocytes, plasma cells and the formation of giant cells. Of the melanotic lymph nodes, 177 were diagnosed as melanosis, 35 were considered to be metastatic regressing melanomas, and two were nonregressing melanomas. This report indicates a high rate of spontaneous regression in swine melanomas detected at slaughter.

RÉSUMÉ

Pendant une période de cinq mois, 220 porcs (provenant de deux abattoirs), ont présenté des lésions macroscopiques au niveau de la peau et des ganglions lymphatiques suggérant la présence de mélanomes. Des ganglions lymphatiques de 214 de ces animaux et des lésions cutanées de 176 autres furent soumis pour examen histopathologique. Au niveau des lésions cutanés, 174 d'entre elles étaient des mélanomes à régression spontanée et les deux autres étaient des mélanomes non-régressants. La régression était caractérisée par une infiltration de lymphocytes, plasmocytes et la formation de cellules géantes dans la lésion. Des ganglions lymphatiques, 177 d'entre eux furent diagnostiqués comme mélanomes, 35 considérés comme des métastases des mélanomes régressants et deux considérés comme des mélanomes non-régressants. Le rapport indique une incidence élevée de régression spontanée pour les mélanomes observés chez les porcs à l'abattage.

INTRODUCTION

Melanosis/melanomas of the skin and/or lymph nodes are occasionally detected in slaughter swine. The disposition of the carcass depends on distinguishing melanosis (non-neoplastic pigmentation) from melanoma and, in the case of melanoma, whether or not the neoplasm is malignant. Melanomas occur as congenital lesions and sporadically in all ages of Duroc-Jersey (1-6), Hormel (7,8), Sinclair (9-17) and their cross-breeds (3,4,18). Research has centered mainly on congenital melanomas. They occur as cutaneous or generalized lesions (skin, lymph nodes and internal organs) (1-3,19,20). Regression is a common occurrence and may occur *in utero* (11) and at various times after birth (15). At one year of age, 95% of cutaneous melanomas have undergone or are undergoing regression (16). Regression is characterized by infiltration of macrophages, small and medium lymphocytes and occasional plasma cells (12-16). It may be responsible for melanosis in regional lymph nodes and some visceral organs (4,11-17,21). Castration of either sex reduced both the incidence and regression of exophytic melanomas during the first year of life in Sinclair swine (17).

Congenital and sporadic cutaneous melanomas vary in size from 0.3 (7) to 25 cm (3); the neoplasms usually are elevated and ulcerated (2,4-6,8,10-12,18). In order to differentiate melanomas from melanosis Thirloway (5) recommends that the mass be rubbed on a wet paper towel or filter paper. A black, inky stain was considered evidence of melanoma. Histologically neoplastic melanocytes possess abundant fine cytoplasmic melanin pigment, while melanophages have coarse dark brown pigment (14) which does not give a positive DOPA reaction. Bleaching and electron microscopy are useful aids in differentiation of melanomas from melanosis (8,10).

There are very few surveys of swine melanosis and melanomas observed at routine slaughter. Caylor (20) reported the prevalence of less than three cases of melanosis per one million carcasses. Davis (23) estimated a prevalence of 3-5% for melanosis. He found a single melanoma in 26 swine neoplasms. Steiner (24) listed no melanomas in a 1949 survey in the USA. Monlux (21) found three melanomas in 28 neoplasms examined in a 1953-54 survey. Melanomas have not been reported in white swine (15).

The purpose of this communication is to support the contention that the majority of melanotic lymph nodes detected in slaughter swine are

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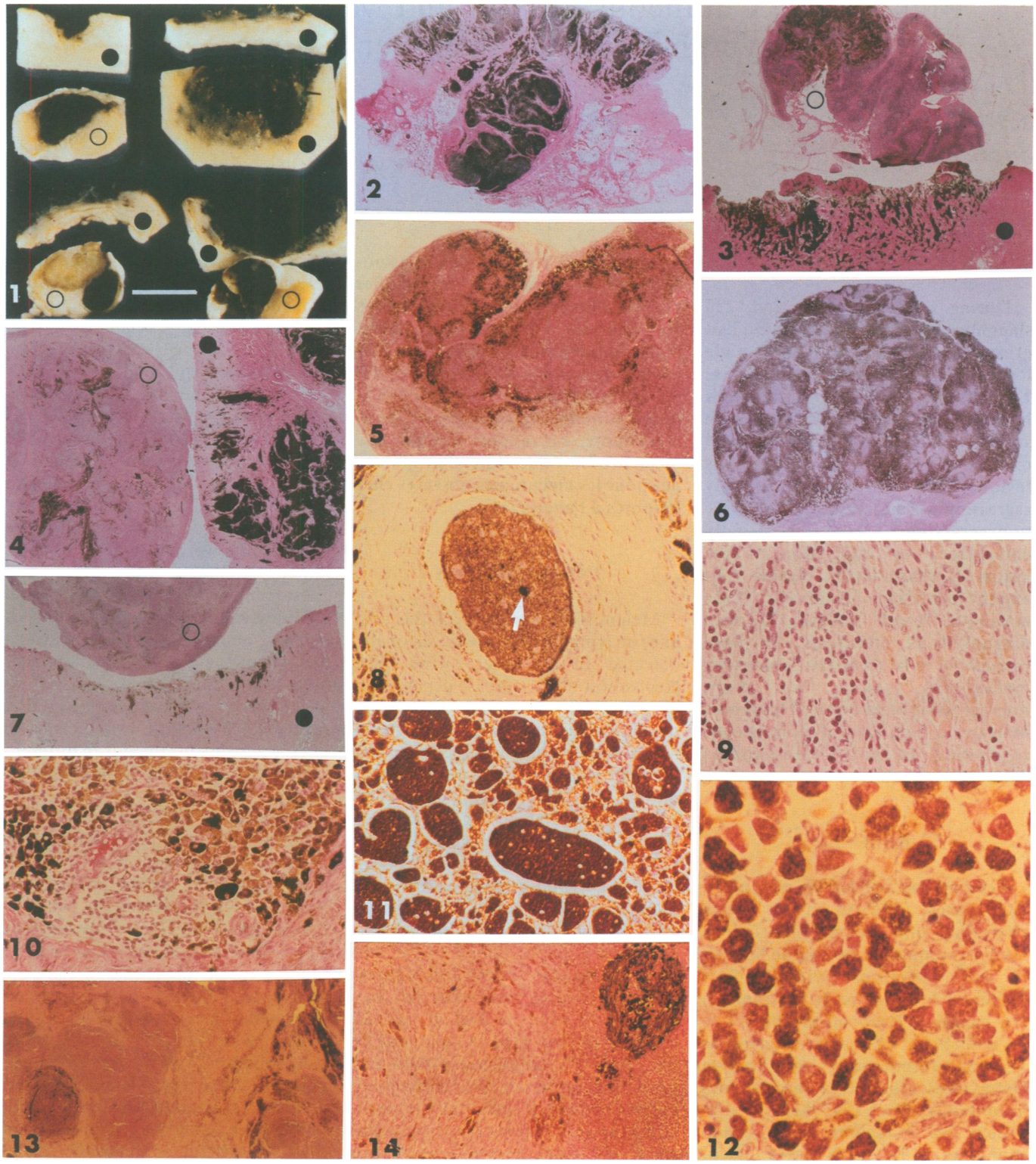

Fig. 1. Cutaneous melanocytic ulcerative lesions (full circle) and corresponding melanotic regional lymph nodes (melanosis) (empty circles). Bar = 1 cm. Fig. 2. Elevated, regressing cutaneous melanoma with subdermal invasion. H&E.X4.5. Fig. 3. Ulcerated cutaneous (full curcle) melanoma, zonal medullary lymph node (empty circle) melanosis. H&E.X4. Fig. 4. Healed cutaneous melanoma with nodular dermal and subdermal spread (full circle); trabecular and peritrabecular lymph node melanosis (empty circle). H&E.X4. Fig. 5. Cortical lymph node melanosis. H&E.X16. Fig. 6. Extensive lymph node melanosis with preserved germinal centers. H&E.X3.5. Fig. 7. Almost completely healed ulcerated lesion (full circle) with a few melanophages in skin and regenerated lymph node (empty circle). H&E.X5. Fig. 8. Proliferation of melanocytes and formation of melanophages (arrow) in the hair follicle and spread to the surrounding tissue. H&E.X160. Fig. 9. Plasma cell infiltration at the edge of a cutaneous melanoma. H&E.X160. Fig. 10. Regressing cutaneous melanocytic lesion with melanophages and lymphocytes infiltration. H&E.X160. Fig. 11. Melanophages and pleomorphic giant cell formation in a melanotic lymph node. H&E.X250. Fig. 12. Melanocytes uniform in size in a melanoma in a lymph node. H&E.X250. Fig. 13. Nodular melanotic and amelanotic fibroma-like proliferation of spindle cells in a cutaneous melanoma. H&E.X16. Fig. 14. Metastatic nodular melanotic and amelanotic lesion in a regional lymph node from the same case as Fig. 13. H&E.X25.

melanosis due to phagocytosis of drained melanin from regressing cutaneous melanocytic lesions.

MATERIALS AND METHODS

During a five month survey (November 1988 to April 1989), 747,014 swine carcasses were inspected at Toronto and Kitchener abattoirs. A total of 1,910 carcasses were reported to have skin melanosis of sufficient severity to warrant trimming of the carcass.

There were 220 pigs with both cutaneous and lymph node lesions suggestive of melanoma. From these 220 pigs, 176 cutaneous and 214 lymph node samples were collected during postmortem examination. The samples were fixed in 10% neutral buffered formalin, sent to this laboratory, routinely processed and stained with hematoxylin and eosin (H&E), and bleached with a 0.25% aqueous solution of potassium permanganate. Three cutaneous lesions and their corresponding lymph nodes were routinely processed for electron microscopy.

RESULTS

Of the 220 carcasses with suspected melanomas, 144 were male and 25 were female (the sex of the other 51 was not reported). Of the 121 cases for which the color of the carcass was reported, 72 were noted to be a colored breed or a cross thereof, while 49 were considered to be crossbred animals that were predominantly white (the color of 99 carcasses was not reported).

Each of the 220 pigs had both cutaneous lesion(s) and melanosis/melanoma of one or more regional lymph nodes in the drainage area of the cutaneous lesion(s). The cutaneous melanocytic lesions were found predominantly on the posterior part of the carcass; a few were observed on the anterior parts. Most were 1-2 cm in diameter (Fig. 1), usually raised (Fig. 2) and ulcerated (Fig. 3). A few samples were 6 cm and one was 12 cm in diameter. About 20 cutaneous and lymph node lesions leached melanin pigment into formalin, and also left a black, inky stain on a wet paper towel.

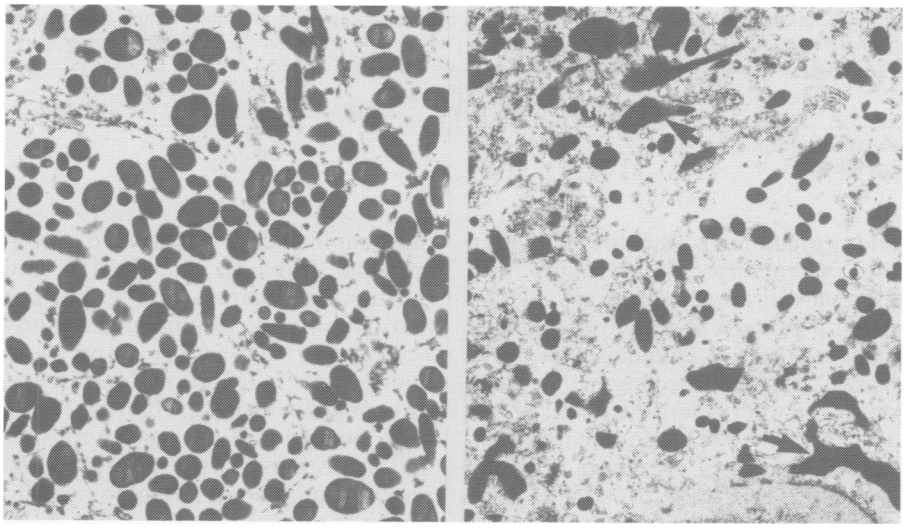

Fig. 15. Elecronmicrograph of melanin granules found in a) nonregressing X7,500 and b) regressing cutaneous melanocytic lesions from the same sample as Fig. 15a. Note uneven size and clumping of the melanin granules (arrows). X6,000.

Malanotic lymph nodes had a zonal (Figs. 3-5) or diffuse (Fig. 6) brown/black color and 35 were variably enlarged.

Of the 176 skin samples submitted (from the 220 carcasses), two were nonregressing, benign melanomas with corresponding invasion of the regional lymph nodes, and 174 were regressing (Table I). Melanocytic cutaneous proliferation (melanomas) appeared to begin in the hair follicle (Fig. 8) and then spread into surrounding connective tissue, sweat glands, subdermal connective tissue (Fig. 4) and fat (Fig. 2). Various stages of regression were detected (Figs. 3,4,7,10). Regression usually commenced by infiltration of the lesion by lymphocytes, plasma cells, macrophages, formation of giant cells

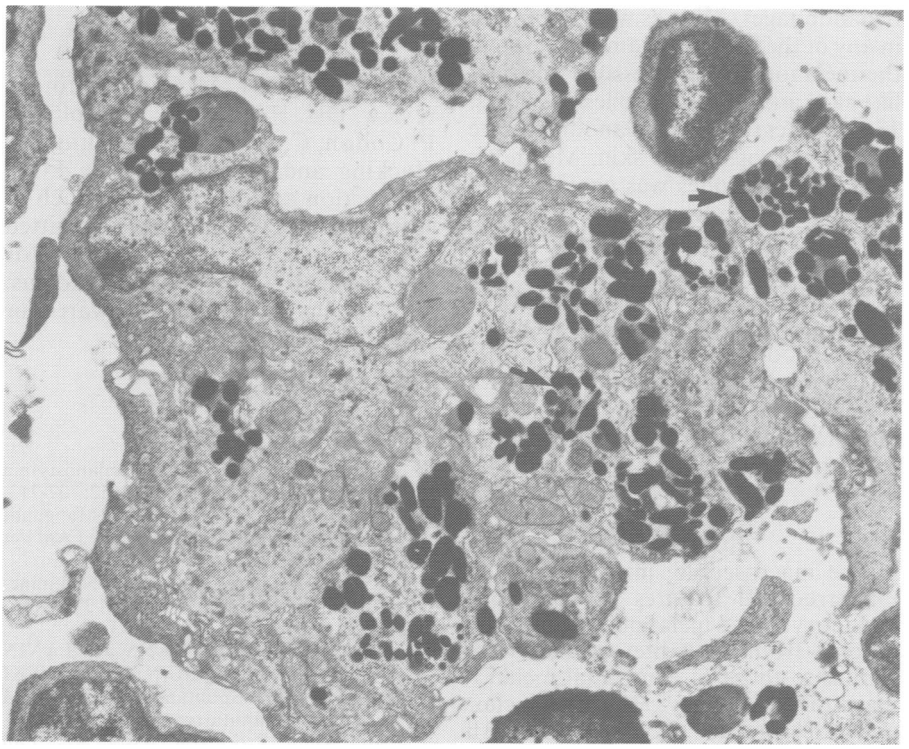

Fig. 16. Degradation of melanin granules in the phagosomes (arrow) of the melanophage in a melanotic lymph node. X6,000.

TABLE I. Histological determination of melanocytic cutaneous and melanotic lymph node lesions from 220 slaughter swine carcasses

	Melanoma	Regressing melanoma	Melanosis	Total	Not submitted
Cutaneous lesions	2	174	0	176	44
Lymph node	2	35	177	214	6

and degradation of the melanin within the macrophages. Melanomas with more advanced regression usually had ovoid pleomorphic melanophages and giant cells with an abundance of coarse, brown cytoplasmic pigment which obscured peripheral nuclei (Figs. 10,11). There were also zonal inflammatory infiltrates of plasma cells and lymphocytes (Figs. 9,10). Healing was characterized by ulceration and fibrosis of the skin with only a few remaining viable melanocytes and melanophages containing coarse melanin granules in the later stages of regression seen in 42 of the 174 regressing melanomas.

Of the 214 melanotic lymph nodes examined, two were nonregressing benign melanomas (Figs. 12,14), 35 had extensive diffuse regressing metastatic melanomas (Figs. 6,11) and 177 had slight to moderate (Figs. 3-5) or extensive (Fig. 6) melanosis.

Melanomas were characterized by focal, cortical, trabecular, peritrabecular, perifollicular and medullary accumulations of melanocytes and melanophages. Mitoses were not found in any of the samples examined, even in the melanotic, nonregressive, fibromalike skin and lymph node lesions (Figs. 13,14). Regressing melanomas were similar to those in the skin. Melanosis of the lymph nodes was characterized by slight, moderate or extensive infiltration of melanophages (Figs. 3-6), and giant cell formation (Fig. 11).

Electronmicrographs of melanocytic cutaneous (Fig. 15) and melanotic lymph node lesions revealed viable melanocytes, and melanophages with clumped cytoplasmic melanin granules and melanin granules undergoing degradation in phagosomes (Fig. 16).

DISCUSSION

The macroscopic, microscopic and ultrastructural features of cutaneous melanocytic and melanotic lymph node lesions from slaughter swine were similar to those of congenital melanomas in Duroc-Jersey, Hormel, Sinclair and crossbreeds (2,5-8, 10-15). All samples were benign and were in various stages of regression except two cutaneous lesions and their corresponding lymph nodes, which were nonregressing (Table I). The benign and self-limiting character of cutaneous and lymph node lesions in this study was based on macroscopic and microscopic ulceration, inflammation, phagocytosis, formation of giant cells, healing and absence of mitoses and metastases to visceral organs and remote lymph nodes. This is similar to previous reports (4,8,15,16,20). Melanosis of regional and rarely visceral lymph nodes was considered to be due to drainage of regressing cutaneous melanocytic lesions.

The low percentage (< 0.3%) of slaughter swine that had melanomas and the high rate of regression (when these tumors occurred) suggests that this neoplasm is of infrequent occurrence and is generally benign, and self-limiting. It is of interest to note that 49 lesions were found in swine that were predominantly white, as melanoma/melanosis is not usually associated with these breeds.

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