

Rare Form of Splenomegaly on a Bovine: A Case Study

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Abstract

Post-mortem on a four year Nguni-Mashona female bovine that had died from trampling by other animals while in transit to the slaughter house showed a rare form of splenomegaly. The spleen weighed 11.9 kilograms and measured 81.5 cm in length 37 cm in width and 9 cm thick. The spleen characteristics could be described as follows: there were no pathological lesions, profuse bleeding occurred on the surface cut with a knife, the pulp caused a bulge on the cut surface which showed a granular appearance, case spleen consistence was firmer than a normal spleen, a smear of the case spleen showed a proliferation of lymphocytes which appeared to have replaced the white pulp, there was hyperplastic growth of reticuloendothelial cells and the case spleen had a dark reddish discoloration. Spleens in cattle of the same breed, age and sex weighed 1.0 ± 0.25 kg and measured 39 ± 5 cm length, 14 ± 3.5 cm width and 3 ± 0.5 cm thick. This is a first documented record of this size of splenomegaly in Zimbabwe

Keywords: Bovine, Nguni-Mashona breed, Splenomegaly, Hyperplasia, Zimbabwe

1. INTRODUCTION

The spleen plays an important role in cellular and immune response to infection and inflammation (Roitt et al 1989). It acts as a blood storage organ and lymphatic organ (Stuart 1970, English et al 1993, Abbas and Litchman 2004)

Spleen anomalies that develop without tangible underlying causes are rare in slaughter animals (Runnel and Monlux 1960). The variations of spleen size, shape, location, position and vascular supply are documented in literature (McLeod 1960, and Andrew 1975). Normal average weight of bovine spleen is 900 grams, length is 35- 45 cm, width is 13-15 cm and thickness is 2-5 cm.

Anatomically the spleen consists of the capsule, the trabecular framework and the splenic pulp, which is the bulk of the spleen. Its framework of reticular tissue is continuous with that of nodules. The spleen contains cells, which include special phagocyte cells known as spleen cells and terminal branches of both arteries and veins (Greep and Weiss 1973). It acts as a filter for circulating microorganisms, old and deformed red cells, and other antigens (Runnel and Monlux 1960, Roitt et al 1989,

Terry et al 2000, Roitt and Delves 2001). The capsule and trabecular framework of the spleen are highly developed and contain smooth muscle fibres whose contraction forces blood from the pulp (Weatherford and Bremer 1944, English et al 1993, Claney 2000 Abbas and Litchman 2004).

Spleen enlargement can be a result of any of the following conditions, proliferation of lymphoid tissue, lymphoid hyperplasia, lymph sarcoma, infiltration by neoplastic cells or lipid-laden macrophages, extramedullary hematopoiesis, increase of phagocytic cells obstruction of vascular drainage leading to congestion, haematoma, septicemia (Salmonelias, anthrax, etc), hemoparasitic diseases (anaplasmosis, babesiosis, theileriosis, trypanosomiasis, heart water slaughter spleen, parasites (hydatidosis), abscesses and tumors (Roitt et al 1989, Forman et al 1992, English et al 1993 Abbas and Litchman 2004). These conditions normally result in an enlarged spleen. However the case on report is an abnormally enlarged spleen twice the usually size of the normal spleen. The aim of this study was to

present a case report on a rare extraordinary splenomegaly from a bovine

2. METHODOLOGY

A female bovine that had died as a result of trampling by other animals in transit to the slaughterhouse had routine post mortem examination done an hour after the death of the animal. Its history age breed and general state of health prior to death were obtained from farm records. Noticing splenomegaly extensive pathological examinations were carried out. The measurements of the spleen, its weight, and shape were taken and photographs were made. The blood smears were made, stained and examined for protozoa and bacteria according to the procedure of (Soulsby 1968 and Gabe 1976). Examination for nematodes cestodes and trematodes were made in their usual habitat according to the procedure of Soulsby (1968). Ten cattle from the same farm, which had trampled the case animal, had similar test conducted on their carcasses

3. RESULTS

The age of the case animal was four years; its breed was mixed Mashona/Nguni. The weight of the spleen was 11.9 kg, its length 81.5 cm, its width 37 cm and thickness was 9cm. Average weight of other animals spleen, same age and breed, was 1.0 ± 0.25 kg, length was 39 ± 5 cm, width was 14 ± 3.5 cm and thickness was 3 ± 0.5 cm. From records of previous postmortems and routine animal health inspection at COLD STORAGE MEAT COMMISSION BULAWAYO (1970-2006) no spleen has been recorded exceeding 3 kg. Figure 1 shows a cropped normal spleen juxtaposed with splenomegaly case, both spleens had a normal shape of a bovine spleen.

Macroscopically the two spleens had no lesions on the surfaces to suggest a pathological condition. Pulp of the splenomegaly case bulged from the cut surface, and appeared smoothly granulated.

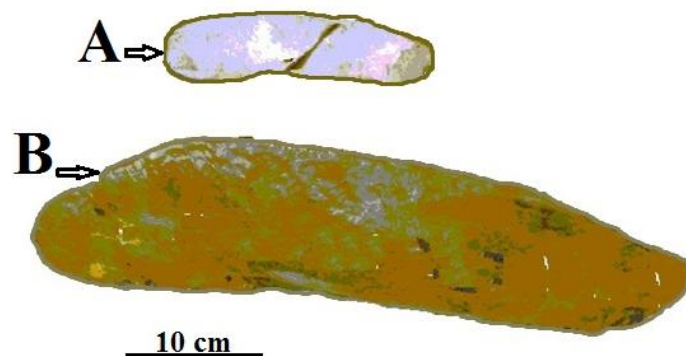


Figure 1. Cropped A is a normal spleen and B is a mega spleen. (Note the shape and dimension of both spleens). Scale bar = 10cm.

Its consistency was firmer than in a normal spleen. The white pulp appeared reduced than in the normal spleen. Excess blood oozed from the cut surface. Microscopically there appeared massive proliferation of large lymphocytes. The proliferation of lymphocytes appears to have replaced the white pulp (Figure 2 A). There was hyperplastic growth of the reticulo endothelial cells, which was followed by growth of the trabaculae. This gave the spleen a dark reddish discolouration. These observations are suggestive of a hypertrophy, hyperplastic splenomegaly case. No pathological cause was associated with this condition, which may suggest a condition of stasis. The spleen might have been responsible for storage of larger quantities of blood as a result of some circulatory disturbances. Such a condition is not common on slaughter cattle.

4. DISCUSSION

Nieberle and Cohrs (1966) reported on a bovine spleen 100 cm long, 50 cm wide 20 cm thick weighing 50 kg or more, however, the age of the animal and its breed are not indicated. The case on report is the first case to be reported in Zimbabwe. Cases of splenomegaly have also been seen in leukemia (the burst spleen), lymph sarcoma, and melanoma. (Grace and Collins 1992, Wilcox 1997, Abbas and Litchman 2004,

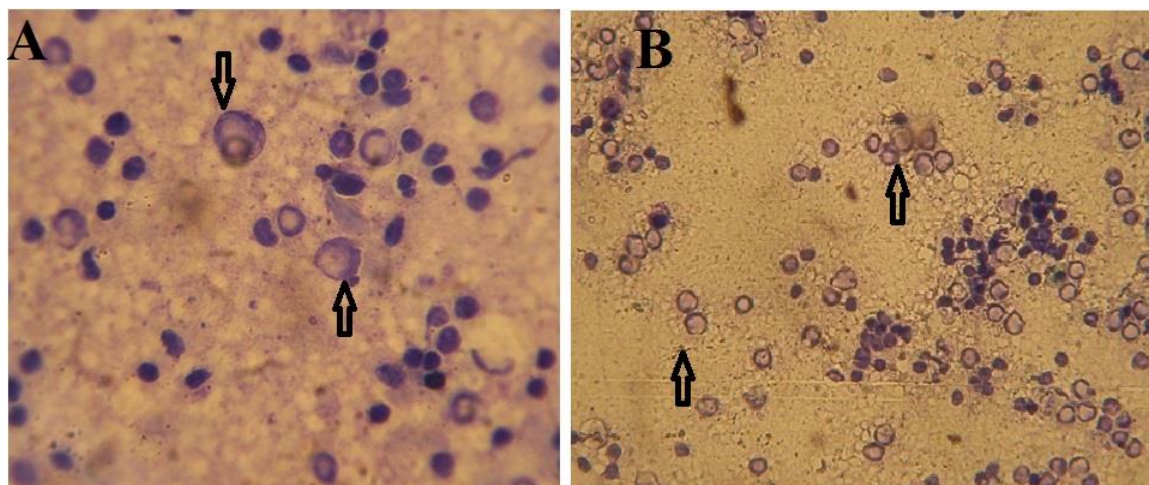


Figure 2. A: Geimsa stained smear of the abnormal spleen cells indicated by arrows. B: is the normal cells indicated by arrows.

Carissa et al 2005). Hyperplasia has also been recorded as a cause of splenomegaly due to blood storage and inflammatory processes (Nieberle and Cohrs 1966, Abbas and Litchman 2004). The case on report is an illustration of a rare case of abnormalities of a spleen. Structurally the case spleen had a normal shape of a bovine spleen indicating there was no genetic defects on the on the spleen tissue. Macroscopically the spleen had no lesions on the surface to suggest a pathological condition this corresponds to the description of a mega spleen by Nieberle and Cohrs (1966). Pulp of the splenomegaly case bulged from the cut surface, and appeared smoothly granulated. Its consistence was firmer than in a normal spleen. The white pulp appeared reduced than in the normal spleen. Excess blood oozed from the cut surface, a situation consistent with previous observations elsewhere Nieberle and Cohrs (1966). Microscopically there appeared massive proliferation of large lymphocytes which appears to have replaced the white pulp. Mainly there was hyperplastic growth of the reticuloendothelial cells, which was followed by growth of the trabaculae. This gave the spleen a dark reddish discolouration, which corresponds to a similar case recorded by Nieberle and Cohrs (1966). The above observations are suggestive of a hypertrophy hyperplastic splenomegaly case. Since no

pathological cause was associated with this condition, this may suggest a condition of stasis as reported by Nieberle and Cohrs (1966). Mutagenic factors could account for such extraordinary splenomegaly as all known

pathological conditions that could cause splenomegaly were not detected in the case animal, this corresponds to a similar case reported by Nieberle and Cohrs (1966). The absence of bacteremia and protozoa in the blood suggest that the animal was relatively healthy.

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