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Fatal Polythene Bag Rumen Impaction in Cattle at Shika-Zaria, Nigeria

A.K. Mohammed and I.R. Muhammad
National Animal Production Research Institute, Ahmadu Bello University,
P.M.B. 1096, Shika-Zaria, Nigeria

Abstract: Clinical and necropsy cases of fatal polythene bag rumen impaction in cattle at the National Animal Production Research Institute, Shika-Zaria, Nigeria is reported. Observed clinical signs in the affected animals were emaciation, inappetance, weakness and recumbency. Woven polythene materials weighing between 2.5 and 4.3 kg partially blocking the rumino-reticular opening were recovered at necropsy. A retrospective study of cattle necropsy case files over a five-year period (2000-2004) indicated that 51.2% of the mortalities had masses of non-degradable polythene materials recovered from their rumens while the meat laboratory records on slaughtered cattle in the Institute within the same period indicated that 40.3% had rumen impaction due to ingestion of polythene materials of various sizes and shapes. The results of the study indicate that clinical signs alone are not good determinants of polythene bag rumen impaction in cattle. The relatively non-availability of pasture in some parts of northern Nigeria during the dry season predisposes malnourished and mineral deficient cattle to scavenge on the widely available used and improperly disposed polythene bags that litter the environment. The need for state legislation against improper disposal of non-biodegradable synthetic polythene materials to make the environment safe for our ruminants is recommended in this study.

Key words: Polythene bags, rumen impaction, cattle, Nigeria

INTRODUCTION

Polythene bag rumen impaction induced by environmental pollution is fast becoming a major problem in ruminants in most parts of Nigeria (Otesile and Akpokodje, 1991; Sanni *et al*., 1998). This is due to widespread use and improper disposal of the non-biodegradable free polythene shopping bags for packaging most of the household consumables. The used polythene bags are thrown on rubbish dumps, road sides and virtually everywhere littering the environment, thereby posing health hazards to ruminants that are left to scavenge around most urban and peri-urban settings (Alayande and Olorede, 1999; Hassan and Kikisagbe, 2001). Most of the household/consumer products wrapped in these polythene bags help improve the palatability of the bags because they either contain remnants of spices, salts, sugar, flavours, detergents, grains or oils (Sanni *et al*., 1998; Lawal, 2002). Malnourished animals, as a result of the usual long dry season and poor quality pasture from November to May in Northern Nigeria exhibit some abnormal appetite that results in feeding on anything available on the range.

These synthetic non-biodegradable polythene materials when ingested by ruminants get lodged in the rumen, thereby compromising the ruminal space and interfering with the normal physiological functions of the rumen. The lodgment of these non-biodegradable materials in the rumen of ruminants results in weight loss, high mortality rates and premature slaughter of sick ruminants (Sanni *et al*., 1998). This study reports on the health hazards posed to ruminants in Nigeria as a result of improper disposal of the widely used synthetic non-biodegradable materials.

MATERIALS AND METHODS

Clinical and necropsy records: The data used in this study were from clinical and necropsy records of rumen impaction documented at the Animal Health Unit of the National Animal Production Research Institute, Shika. The clinical cases involved 3 young cattle (2 Friesian×Bunaji heifers of about 3 years old and a 2-year-old Bunaji bull) presented with complaint of wasting, lagging behind during grazing, rough hair coats and lacrimation. Blood and faecal samples were screened for haemoparasites, complete blood count and helminth parasites. Ingested polythene materials recovered at necropsy were weighed using a 20 kg capacity sensitive weighing scale (HANA^{R} the big boss) shown in Fig. 1.

Corresponding Author: A.K. Mohammed, National Animal Production Research Institute, Ahmadu Bello University P.M.B. 1096, Shika-Zaria, Nigeria

Fig. 1: Weighed mass of non-degradable polythene material recovered from rumen at necropsy

Meat laboratory: Data on slaughtered cattle in the Meat Laboratory section of the Institute were investigated for frequency and types of foreign bodies recovered from the rumens of slaughtered cattle over a five-year period (2000-2004).

RESULTS

Clinical cases: The results obtained from the blood samples are given in Table 1. The mean values obtained in this study for red blood cells, haemoglobin and packed cell volume were within the lower normal ranges while the white blood cell values indicated leucocytosis. All the three cattle were positive for *Anaplasma bovis* (+) and *Strongyle* eggs (++). The two Friesian crossed heifers had enlarged prescapular lymph nodes and pale mucous membrane. Rectal temperature, pulse, respiration rates and rumen motility were normal in all cases.

Based on the laboratory results the affected cattle were treated with Benezal drench(R) at 7.5 mg kg^{-1} bodyweight (2.5% /V *Albendazole:* Bimeda Chemicals Ltd, Dublin, Ireland) and Tetroxy 10% (R) at 1 mL 20 kg^{-1} bodyweight (10% *Oxytetracycline* injection: Bimeda Chemicals Ltd, Dublin, Ireland) for 5 days. The body conditions continued to deteriorate despite the treatment. The animals were sampled again but were however; negative for parasites. One heifer became recumbent and died 3 weeks after the treatment while the remaining 2 died 4 weeks later.

Necropsy findings: Woven polythene materials weighing between 2.5 and 4.3 kg with strands of various shapes partially occluding the rumino-reticular opening of the rumens were recovered in all the three animals (Fig. 1).

Table 1: Mean haemogram of the 3 sick cattle

Parameter	Mean value
RBC	$5.6\pm0.45\times10^{12}L^{-1}$
Hb	8.5 ± 0.71 g L^{-1}
PCV	23±2.6 %
WBC	$18\pm1.4\times10^{9}$ L^{-1}
Neutrophils	41±3.1%
Lymphocytes	53±2.9%
Monocytes	2±0.2%
Eosinophils	4±1.9%

Table 2: Retrospective necropsy cases of polythene bag rumen impaction at Shika (2000-2004)

Year	Total number of mortality	Number positive for polythene bag rumen impaction	(%)
2000	6	4	8.9
2001	10	4	8.9
2002	9	3	6.7
2003	12	7	15.6
2004	8	5	11.1
Total	45	23	51.2

Table 3: Cases of polythene bag rumen impaction in Bunaji bulls slaughtered at the Institute meat laboratory [2000-2004]

Year	Total number of slaughtered	Number positive for polythene bag rumen impaction	(%)
2000	10	5	7.46
2001	14	6	8.95
2002	12	4	5.97
2003	15	5	7.46
2004	16	7	10.45
Total	67	27	40.29

Also, a retrospective study of the necropsy files of cattle that died of conditions other than impaction over a five-year period (2000-2004) indicated that 51.2% of the mortalities had masses of non-degradable polythene bags and other indigestible materials recovered from their rumens (Table 2).

Institute meat laboratory: Slaughter records indicated that 40.3% of the Bunaji cattle slaughtered within the

Fig. 2: Scavenging cattle at a grazing point littered with used polythene materials (arrowed)

past 5 years (2000-2004) had their rumens impacted with polythene materials of various sizes and shapes (Table 3). Over 90% the animals were bought from the surrounding peri-urban markets for the slaughter programme.

DISCUSSION

The ingestion of materials other than normal food referred to as pica or allotrophagia resulting from a variety of nutritional deficiencies of either bulk, fibre or of individual nutrients (Radostits *et al*., 1995) present clearly the problems inherent in livestock husbandry in Northern Nigeria. Livestock are left to scavenge around without adequate provision of nutritional requirements as shown on Fig. 2, therefore predisposing the animals to allotrophagia which may lead to the lodgment of indigestible materials in their rumens and resulting in progressive weight loss, high mortality and premature slaughter of the affected ruminants (Sanni *et al*., 1998). Also, the increasing pressure on land and growing human populations have resulted in livestock being raised intensively on smaller tracts of land, with consequential over grazing of the few available range leading to malnourishment.

Correction of the condition by rumenotomy in the indigenous animal is uneconomical; the best option is the control of the predisposing factor, which is environmental pollution with polythene bags. Pollution levels of polythene materials have worsened over the years because they are persistent and cannot be broken down by normal biodegradation systems. This study therefore calls for a state legislation to enforce proper disposal of the discarded polythene bags used for household consumables.

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