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تنكز الدهن في الأبقار البلدية
٢- القيمة التشخيصية بصورة التحليل الكهربى لزلال السيرم

علي السباعي ، هوفمان* ، عبداللطيف بيومى**

اجرى البحث على عدد ٣٠ رأس من الابقار البلدية . وعشرة أبقار من اجمالى
العدد كانت بحالة صحية جيدة وأخذت في تصميم البحث للمقارنة بالابقار المريضة .

شخصت هذه الحالات عن طريق الحس المستقيمي - والعلامات المرضية الأخرى في
صورة اسهال - نفاخ - أو عسر متفاوت اثناء الولادة .

كانت نتيجة الفحص المستقيمي عبارة عن وجود تجمعات متفاوتة الحجم من الدهن
المتنكز حول الأمعاء والكلية وفي الأعضاء الداخلية الأخرى .

أفادت نتيجة التحليل الكهربى لزلال السيرم ارتفاع ملحوظ في نسبة
الجاما جلوبولين مع عدم تغير في المشتقات الأخرى للزلال .

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**LIPOMATOSIS WITH ABDOMINAL FAT NECROSIS IN NATIVE BREED
COWS IN ASSIUT EGYPT**
III- CLINICAL SIGNIFICANCE OF SERUM PROTEIN ELECTROPHORESIS
(With 2 Tables & 6 Figs.)

By
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SUMMARY

A total of 30 native breed cows in Assiut Egypt were used in this investigation. Ten cows were clinically healthy which served as a control. The diseased cows were selected according to the rectal findings. All animals were examined clinically. The clinical signs in some cases in the form of mild constipation or diarrhoea, mild tympany, difficulties at delivery or abortion, while in some other cases no clinical signs were achieved. Rectal examination of diseased cows revealed a hard irregular masses, varied in shape and size in the pelvic cavity, around the intestine, kidneys and omentum. Serum protein electrophoresis was carried out using Agrose-film (Corning Acl Uni. Film). Serum electrophoresis revealed a marked decrease in serum Albumen, and significant rise in gamma-globulin value. No changes were observed in the values of alpha B-globulin and total protein as well.

INTRODUCTION

Lipomatosis with fat necrosis in bovin has been given much attention by various Author's. The condition was described as lipomatosis. ITO; MIRA; OSHIMA and NOMAKANNAIE (1968). Previous investigation FDGSON (1952) described the disease as lipomatus Tumour, which was found irregular masses around the wall of the intestine. Lipomatosis in association with fat necrosis was identified also throughout different areas of the world, England (JOST, 1967), Australian (ITO, et al. 1968), West Germany (DIRKSEN, 1965) and in Egypt EL-SEBAI, et al. (1984) and BAYOUMI, et al. (1984).

Some of the diseased cows showed a signs digestive disturbances in the form of constipation, diarrhea tympany and difficulties associated with pregnancy and parturation ROSENBERGER (1978) and EL-SEBAIE, et al. (1984). In some others had no obvious clinical signs PAPP and WILLIAMS (1970) and EL-SEBAIE (1984).

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A. EL-SEBAIE, et al.

A review of literature on the etiology and pathogenesis of these pathological processes are incompletely understood. HOF LUND, et al. (1953) attributed such condition to the disturbance of circulation, while DIRKSEN (1965) stated and hormonal disturbance could be a cause of such condition. Genetic influences were suggested after EDGESON (1952) on Previous studies on such cases in native breed cows, EL-SEBAIE, et al. (1984) correlate the incidence of lipomatosis to a marked depression of the thyroid gland and disturbance in fat metabolic pathways as well.

Electrophoretic pattern of serum protein was studied in cases associated with lipomatosis DIRKSEN (1965) stated a marked decrease in the albumen values while values of gamma globulin showed a significant increase.

In previous study on lipomatosis with fat necrosis in native breed cows, some parameters were determined and gave some information on the possibilities of disturbances in fat metabolic pathway. Further studies on the biochemical aspect of serum with special references to serum protein and its electrophoretic pattern was aimed in this investigation to determine the extent of changes of such parameters and their diagnostic aid under these circumstances.

MATERIAL and METHODS

A herd of 200 native breed cows was kept for milk production in dairy farm El-Awamer Assiut-Egypt. Some cows died without apparant clinical signs. Twenty cows were selected according to the findings of rectal examination, ten cows-out of them were slaughtered. Autopsy findings revealed accumulation of hard irregular hard masses in prerenal, around the intestine and in pelvic cavity. Blood samples were collected by means of vein-puncture, later on serum was separated and used for total serum protein and its fractionation. Total serum protein was determined by using reagent kits (Boehringer-Mannheimer W. Germany).

Serum protein electrophoresis was carried out by pipetting 0.8 μ L of serum to the sample walls of the agarose film using Hamilton Syrnig. The film was then processed for approximately 35 minutes. Using 95 ml of universal barbital buffer in each chamber of the cell. As a completion of the electrophoretic separation, the film was placed in 200 ml of the amido-black 10 B working stain solution for 15 minutes, removed from the stain solution and then rinsed in 200 ml of acetic acid clearing solution using magnetic stirrer operating for 30 seconds. The film was then completely dried for 20 minutes, allowed to cool at room temperature then washed in the 5% acetic acid clearing solution to clear the excess stain prior to drying for one minute with agitation. It is then transferred to a second stirr stain dish containing 5% acetic acid solution rinsed again for one minute until the excess stain is removed and dried for 15 minutes. Densitometry of the stained film was performed with DCD-16 digital computing densitometer (Gelman Instrument Company) Model 39434 fitted with 520 nm interference filter, with this densitometer values for optical density are automatically plotted as ordinates against distances along the electrophoresis strip as abscissias Gaussian Curves were constructed for each protein fraction. The result were expressed by taking as zero the migration of the Gamma-globulin and as 100 that of the albumen.

Statistical data were done according to SNEDECOR and COCHRAN (1967).

BOVINE LIPOMATOSIS

RESULTS

The examined cattle showed no clinical signs and generally in a good health and excellent flesh., abnormal massive deposition of subcutaneous fat in perineal region was observed. Some of cows revealed a signs related to digestive disturbance in the form of tympany, diarrhea and/or constipation. Problems associated with fertility and difficulties at parturation were also achieved. The diseased cows were selected mainly according to rectal findings, which revealed the presences of hard irrigrular masses on the anterior floor and walls of the pelvic canal, surrounding and ventral to the left kidney and in areas around of the small intestine in the right side. Some of cases had such extensive consolidation within the pelvis that the exploratory hand of examiners could not be introduced to it.

Macromorphological findings:

Slaughtered animals were rich in subcutaneous fat in the perineal region, and in the abdominal cavity as well. Fat lesions were the only recognizable abnormalities. The massive fat tissue deposition were localised in peritonium (Fig 1,2), preareal (Fig 4) pelvic areas (Fig. 3) and around that instestinal wall. No abnormal deposition of fat could be recognised in the pericardial and intermuscular tissue. Around the intestine and in the peritonium, casts of lipomatosis growths associated with adiponecrotic lesion were observed specially marked around the pelvic part of the intestine (Fig. 1,2,4). The excessive fat depostion tooke maropholgically either numerous and multiple sized fatty tissue and this form was usually restricted to the preitonium (Fig. 1,2). A masses of necrotic fat tissues reached the size of child head were localised in pelvic area. The different masses of necrotic fat tissue were hard in touch and on cut section revealed scattered peticheal haemorrhage. The large masses showed more or less connective tissue encapsulation. In the adipose tissue a circumscribed yellowish white to darkly abaque areas of necrosis were observed (Fig. 2), such areas were hard upon palpation and their cut surface were dry and cheesy.

Results of serum protein electrophoresis:

Determination of total serum protein, revealed that there are very small difference between the Healthy and the diseased cows in the mean concentration. The mean values in healthy and diseased groups were 92.30 ± 1.91 and 90.97 ± 1.76 g/L respectively.

The electrophoretic patern in both groups showed, significant decrease in the values of albumen, on the other hand a marked elevation of the values of gamma globulin Table (1,2) (Fig. 5,6).

In every cases the carcass fat was intensely bright yellow. An irrigrular masses of very hard fat were scattered throught the abdominal, plevic and anterior perirenal fat (Fig. 3,4). These lesions were a decper yellow than the adjacent fat and often contained areas that were coloured chalky white or organe (Fig. 1,2).

The masses varied in size and were difficults to incise and occasionally a gritty sensation could be felt.

The lesion occured most frequently in the small intestine peritonium and rectal mesentry where they often formed obstructive casts around the intestine (Fig. 5,6).

A. EL-SEBAIE, et al.**DISCUSSION**

The occurrence of lipomatosis with fat necrosis was recorded recently in native breed cows at Assiut-Egypt as enzootic hard problem, EL-SEBAIE (1984). The major part of the diseased cows had excellent healthy appearance without any clinical significance, and our clinical observations agreed best with reports previously published after DIRKSEN (1965), and PAPP and WILLIAMS (1970) special clinical signs associated with lipomatosis were on contrary mentioned by ITO, et al. (1968).

From the published literature on the aetiology, pathogenesis and biochemistry of such condition it appears that the process of lipomatosis is not completely understood. Previous trials were conducted in this respect and included some of biochemical aspect of the disease. The present study on serum protein and its fractionations revealed there are no differences between the healthy and diseased cows in the mean concentration of total serum protein and the results fall well within the range of total serum protein in cattle published by CORNELIUS (1960); MYLREA and HEAL (1968) and MEDWAY (1969). It is of considerable interest to state here, that hypo-albuminemia is the common findings in conditions associated with lipomatosis, while there was significant increase in the gamma globulin fraction. DIRKSEN (1968) and CORNELIUS (1960) have reported similar changes in serum albumen and gamma globulins fractions in relation to lipomatosis and similar chronic cases. Possible explanation of such increase in gamma-globulin fraction that the chronic process elaborate an abnormal type of gamma globulin which may migrate electrophoretically at a rate equal to gamma globulin CORNELIUS (1960).

The findings of gross anatomy pointed out that the disease involves two pathological conditions, firstly the appearance of lipomatosis growth or hyperplastic fatty tissue and secondly adiponecrotic lesion associating the process lipomatosis was observed. Those necrotic lesions were restricted to the nephritic and fatty tissue lumps. Similar macromorphological observation were studied by ITO, et al. (1968), JOEST (1967). From the above mentioned observation and previously reviewed and discussed results EL-SEBAIE, et al. (1984) and BAYOUMI, et al. (1984) it could be concluded that the bovine lipomatosis with fat necrosis is considered a complex syndrome and its pathogenous not completely understood. From the clinical, biochemical and pathological observations, some evidences of the involvement of thyroid gland and consequently a disturbance in fat metabolic pathways were indicated EL-SEBAIE, et al. (1984). Serum electrophoretic pattern throw some light in diagnostic purposes of such condition.

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BOVINE LIPOMATOSIS

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Table (1)
Serum proteins Electrophoresis in apparently healthy Cows

No.	Total protein g/L	Alb	Alph-1	Alph-2	β_1	β_2	Gamma
1	93.0	63.28	1.87	6.74	16.36		11.73
2	91.4	52.72	7.41		14.29	15.03	10.81
3	90.7	54.93	9.06	9.97	10.21	7.74	8.06
4	93.67	56.03	4.37	7.14	7.96	18.30	6.16
5	95.52	50.44	9.48	5.38	10.35	19.15	5.16
6	92.53	46.20	6.44	7.31	16.08	17.63	5.76
7	92.53	43.37	9.74	9.45	22.72	9.49	5.21
8	88.40	49.53	12.77	9.14	6.11	8.13	14.39
9	91.87	55.14	7.65	6.80	12.70	11.38	6.300
10	93.03	54.50	10.60	8.74	11.36	8.40	6.10
\bar{x}	92.30	52.61	8.66	7.99	12.81	12.80	7.96
S.D	+1.71	+5.59	+2.27	+1.57	+4.79	+4.72	+3.22

Table (2)
Serum proteins electrophorsis in cows showing lipomatosis with fat necrosis

No.	Total protein g/L	Alb.	Alph-1	Alph-2	β_1	β_2	Gamma
1	91.30	31.43	18.96	10.98	29.92		19.64
2	93.07	39.50	7.71	8.39	12.00	15.06	17.31
3	89.60	38.95	5.88	10.15	25.94		19.05
4	90.80	37.50	6.02	9.50	13.88		25.09
5	88.90	34.30	5.17	6.83	10.17	19.17	22.56
6	91.30	20.94	10.74	18.96	17.82		31.51
7	92.34	20.00	9.66	23.38	14.96	11.15	14.82
8	92.7	26.80	11.41	24.45	16.95		26.37
9	88.60	37.50	6.02	9.50	13.88		25.09
10	94.00	37.70	3.63	8.90	30.45		18.52
11	87.38	25.63	12.81	7.30	11.23	16.84	26.19
12	90.4	28.20	9.70	11.35	10.18	14.12	26.43
13	91.80	34.58	12.30	83.00	29.74		22.52
14	89.66	37.03	16.57	20.03	10.00	9.01	17.30
15	90.16	29.35	8.43	12.34	11.65	12.44	22.79
16	92.	30.41	7.52	13.67	9.09	14.52	24.79
17	93.	34.16	6.34	11.87	13.25	10.01	24.73
18	88.7	36.18	9.21	8.44	12.38	11.54	22.25
19	92.30	35.38	6.55	11.45	14.65	10.42	21.55
20	91.44	38.16	9.82	10.44	13.78	7.14	21.35
\bar{x}	90.97	32.39	8.41	11.88	13.21	14.15	22.78
S.D	+1.76	+2.84	+3.01	+4.85	+0.99	+3.46	+4.02

A. D. STEWART, JR.

Table 1
Summary of the results of the analysis of the data from the experiment with the following conditions:

Run	Time	Temp	Pressure	Flow	Rate	Yield	Notes
1	10.0	100	100	100	100	100	
2	10.0	100	100	100	100	100	
3	10.0	100	100	100	100	100	
4	10.0	100	100	100	100	100	
5	10.0	100	100	100	100	100	
6	10.0	100	100	100	100	100	
7	10.0	100	100	100	100	100	
8	10.0	100	100	100	100	100	
9	10.0	100	100	100	100	100	
10	10.0	100	100	100	100	100	
11	10.0	100	100	100	100	100	
12	10.0	100	100	100	100	100	
13	10.0	100	100	100	100	100	
14	10.0	100	100	100	100	100	
15	10.0	100	100	100	100	100	
16	10.0	100	100	100	100	100	
17	10.0	100	100	100	100	100	
18	10.0	100	100	100	100	100	
19	10.0	100	100	100	100	100	
20	10.0	100	100	100	100	100	
21	10.0	100	100	100	100	100	
22	10.0	100	100	100	100	100	
23	10.0	100	100	100	100	100	
24	10.0	100	100	100	100	100	
25	10.0	100	100	100	100	100	
26	10.0	100	100	100	100	100	
27	10.0	100	100	100	100	100	
28	10.0	100	100	100	100	100	
29	10.0	100	100	100	100	100	
30	10.0	100	100	100	100	100	
31	10.0	100	100	100	100	100	
32	10.0	100	100	100	100	100	
33	10.0	100	100	100	100	100	
34	10.0	100	100	100	100	100	
35	10.0	100	100	100	100	100	
36	10.0	100	100	100	100	100	
37	10.0	100	100	100	100	100	
38	10.0	100	100	100	100	100	
39	10.0	100	100	100	100	100	
40	10.0	100	100	100	100	100	
41	10.0	100	100	100	100	100	
42	10.0	100	100	100	100	100	
43	10.0	100	100	100	100	100	
44	10.0	100	100	100	100	100	
45	10.0	100	100	100	100	100	
46	10.0	100	100	100	100	100	
47	10.0	100	100	100	100	100	
48	10.0	100	100	100	100	100	
49	10.0	100	100	100	100	100	
50	10.0	100	100	100	100	100	
51	10.0	100	100	100	100	100	
52	10.0	100	100	100	100	100	
53	10.0	100	100	100	100	100	
54	10.0	100	100	100	100	100	
55	10.0	100	100	100	100	100	
56	10.0	100	100	100	100	100	
57	10.0	100	100	100	100	100	
58	10.0	100	100	100	100	100	
59	10.0	100	100	100	100	100	
60	10.0	100	100	100	100	100	
61	10.0	100	100	100	100	100	
62	10.0	100	100	100	100	100	
63	10.0	100	100	100	100	100	
64	10.0	100	100	100	100	100	
65	10.0	100	100	100	100	100	
66	10.0	100	100	100	100	100	
67	10.0	100	100	100	100	100	
68	10.0	100	100	100	100	100	
69	10.0	100	100	100	100	100	
70	10.0	100	100	100	100	100	
71	10.0	100	100	100	100	100	
72	10.0	100	100	100	100	100	
73	10.0	100	100	100	100	100	
74	10.0	100	100	100	100	100	
75	10.0	100	100	100	100	100	
76	10.0	100	100	100	100	100	
77	10.0	100	100	100	100	100	
78	10.0	100	100	100	100	100	
79	10.0	100	100	100	100	100	
80	10.0	100	100	100	100	100	
81	10.0	100	100	100	100	100	
82	10.0	100	100	100	100	100	
83	10.0	100	100	100	100	100	
84	10.0	100	100	100	100	100	
85	10.0	100	100	100	100	100	
86	10.0	100	100	100	100	100	
87	10.0	100	100	100	100	100	
88	10.0	100	100	100	100	100	
89	10.0	100	100	100	100	100	
90	10.0	100	100	100	100	100	
91	10.0	100	100	100	100	100	
92	10.0	100	100	100	100	100	
93	10.0	100	100	100	100	100	
94	10.0	100	100	100	100	100	
95	10.0	100	100	100	100	100	
96	10.0	100	100	100	100	100	
97	10.0	100	100	100	100	100	
98	10.0	100	100	100	100	100	
99	10.0	100	100	100	100	100	
100	10.0	100	100	100	100	100	



Fig. (3): Massive deposition of necrotic fat in prerenal area

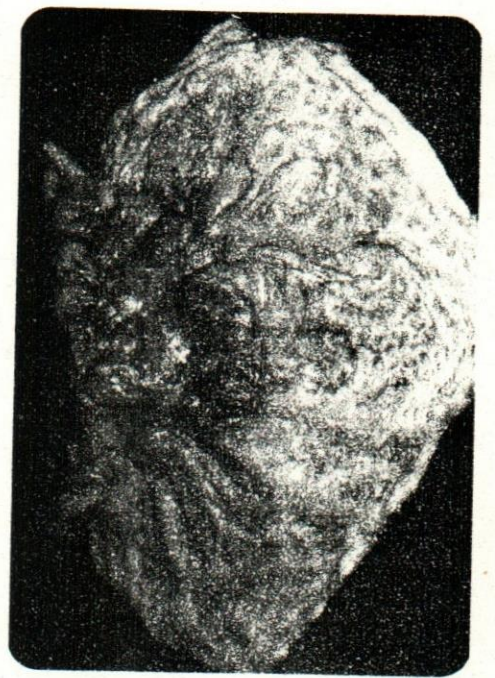


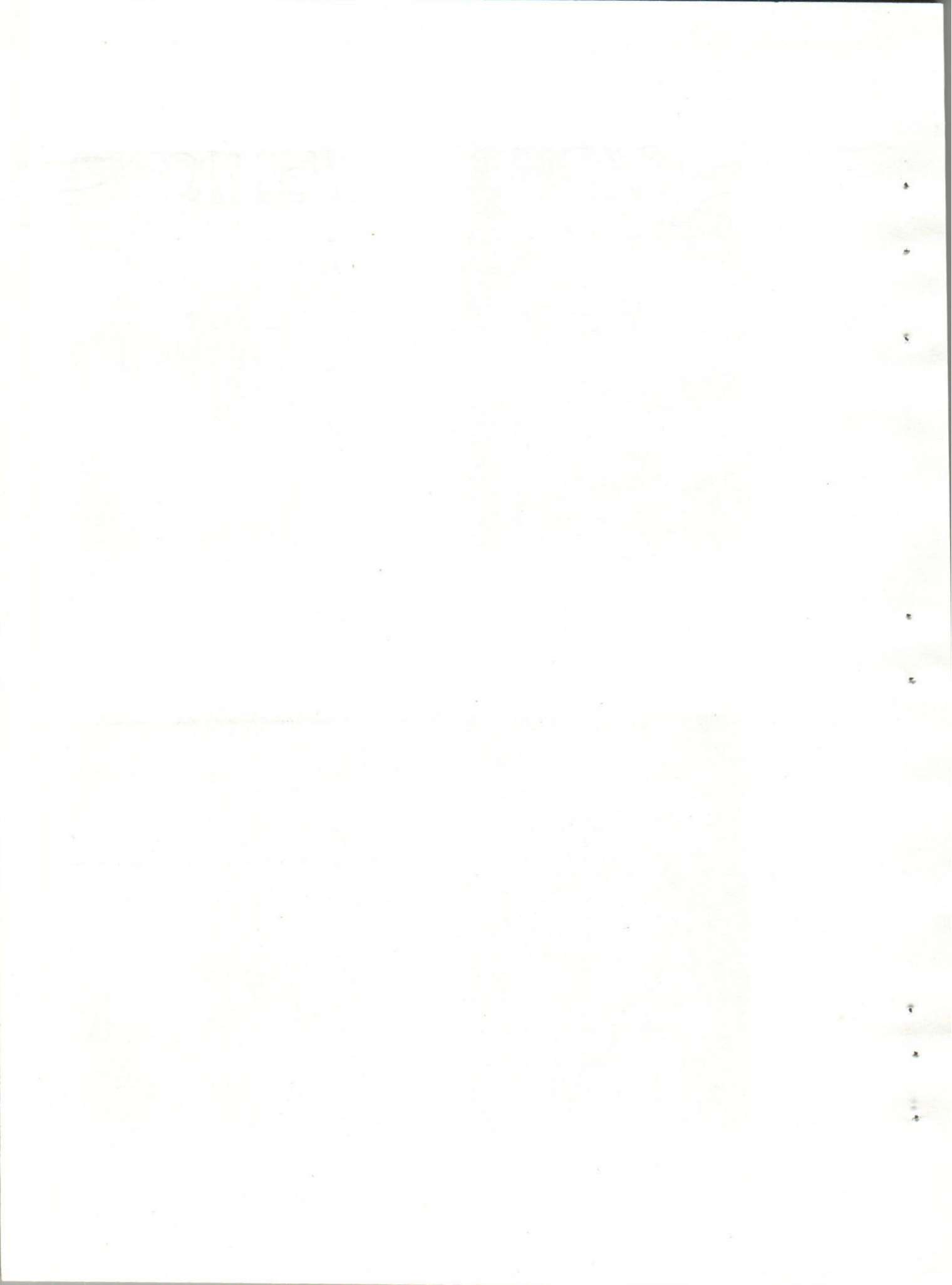
Fig. (1): Peritonium showed massive deposition of necrotic fat



Fig. (4): Dry etheoxy appearance of fat around the kidney on cut surface



Fig. (2): Accumulation of hard irregular necrotic masses of fat tissue in the peritonium



NAME _____
 I.D. NO. _____
 LOCATION El-Awaamer
 SEX Cow AGE 4 years
 DOCTOR _____

	BY	DATE	TIME
REQUESTED			
DRAWN			
PERFORMED			
REPORTED			

GELMAN
 CATALOG NO. 9362

COMMENTS Healthy cow

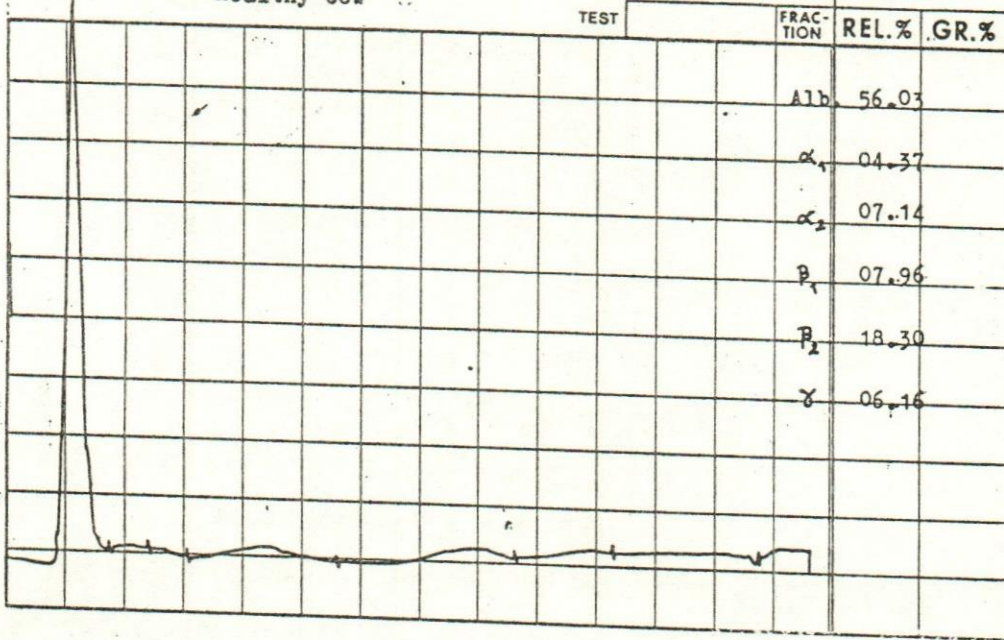


Fig. (5): Electrophoretic pattern of Serum proteins in a healthy cow

NAME _____
 I.D. NO. _____
 LOCATION El-Awaamer
 SEX Cow AGE 5 years
 DOCTOR _____

	BY	DATE	TIME
REQUESTED			
DRAWN			
PERFORMED			
REPORTED			

GELMAN
 CATALOG NO. 9362

COMMENTS Lipomatosis

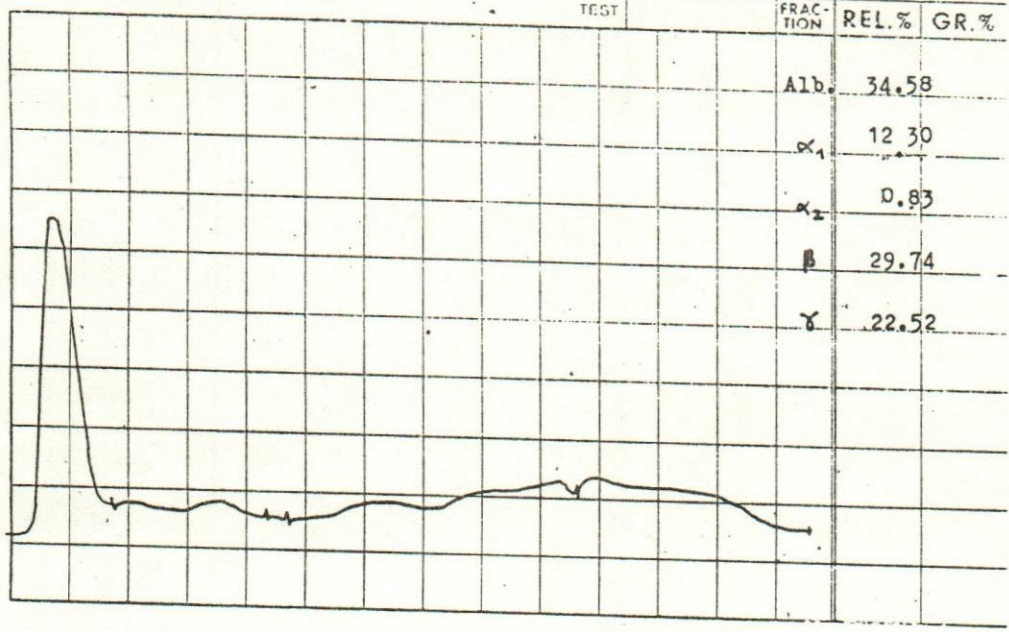


Fig. (6): Electrophoretic pattern of serum proteins in a cow showed lipomatosis with abdominal fat necrosis