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CLINICAL SIGNIFICANCE OF OESOPHAGEAL GROOVE VASOPRESSIN INDUCED-CLOSURE

2- A new concept in the oral glucose treatment of pregnancy toxaemia in ewes

BY

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ITRODUCTION

Closure of oesophageal groove in adult ruminants could be achieved by intravenous injection of LVP (Nicholson, 1981; Mikhail, 1986 and El-Hamamsy et al., 1990). It forms an almost closed tube so that solutions and drugs could be convayed directly into the abomasum and lower alimentary tract bypassing the rumino-reticulum (Ruckebusch and Thivend, 1980). It was reported that the oral glucose administration after premedication with LVP resulted in a high blood glucose level, as 80% or more of the glucose will be absorbed rapidely from the abomasum (Mc Allan and Lewis, 1985). A peak of blood glucose was reached within 30 minutes, the plateau was maintained up to 4 hours then dropped to the prelimenary level after 8 hours (Mikhail, 1986). On the other hand Parasad and Kaul (1981) reported that a considerable rise in blood glucose concentration occured as early as the fifth minute after intravenous administration. The plateau was almost maintained between 5 and 30 minutes and the pre-injection level was reached within 2-3 hours.

Treatment of pregnancy toxaemia in ewes seems, in general, to be difficult and the results are variable and often disappointing. Several therapies including the standard replacement of glucose by intravenous injection together with oral administration of glucogenic substance (Blood and Radostitis, 1989) have been described. Scholz and Rehage (1987) reported the use of oral glucose in the treatment of bovine primary ketosis.

Reported herein a clinical trial to determine the clinical significance of oral glucose administration, after pre-medication with LVP to elecite oesophageal groove closure, in the treatment of pregnancy toxaemia in ewes.

MATERIAL AND METHODS

Eleven ewes suffering from pregnancy toxaemia were recorded in a newly collected sheep flock belonging to a private farm. The pregnant ewes were of local breods and their age range from 2-3 years. Three out of them showed sever nervous signs with blindness followed by death. The other 8 cases developed less sever or moderate signs. Diagnosis of the disease was based upon the history of management, clinical signs, presence of ketonuria, as well as necropsy findings of the dead cases.

After the first examination, the ewes were allocated into 2 treatment groups, 4 animals each. The first group (Ga) was treated with the standard replacement therapy; I.V. glucose followed by oral administration of glycerol as a glucogenic substance (Blood and Radostitis, 1989). The second group(Gb) was treated with oral glucse, after premedication with LVP, at the dose rate of 0.1 I.U/kg LBW to elecite oesphageal groove closure (Mikhail, 1986 and Scholz and Rehage, 1987). Both tratments were given twice a day, morning and afternoon, for 3 successive days as shown in Table(1). Another 6 clinically

normal pregnant ewes from the same flock were used as a control group (Gc). Response of tretments and recovery were monitored daily through clinical and biochemical examinations.

Blood samples were collected each day, prior to application of the morning treatment. Icecooled blood samples were immediately transported to the laboratory for determination of the levels of glucose (Dubowski, 1962), total keton bodies (Weichselbaum and Somogyl, 1941) and non estrified fatty acids NEFA (Wensing et al., 1975). On the first examination, urine keton bodies were estimated semiquantitatively by means of the Rothera reaction (Keto-Diastix, Miles Laboratories, Inc. USA) using undiluted and diluted samples.

Statistical analysis were employed according to Senedcor and Chochran (1980). The obtained results are shown in Table (2) and Figurs (1-3).

Table (1): Plan and cource of treatment of pregnancy toxaemia in both groups.

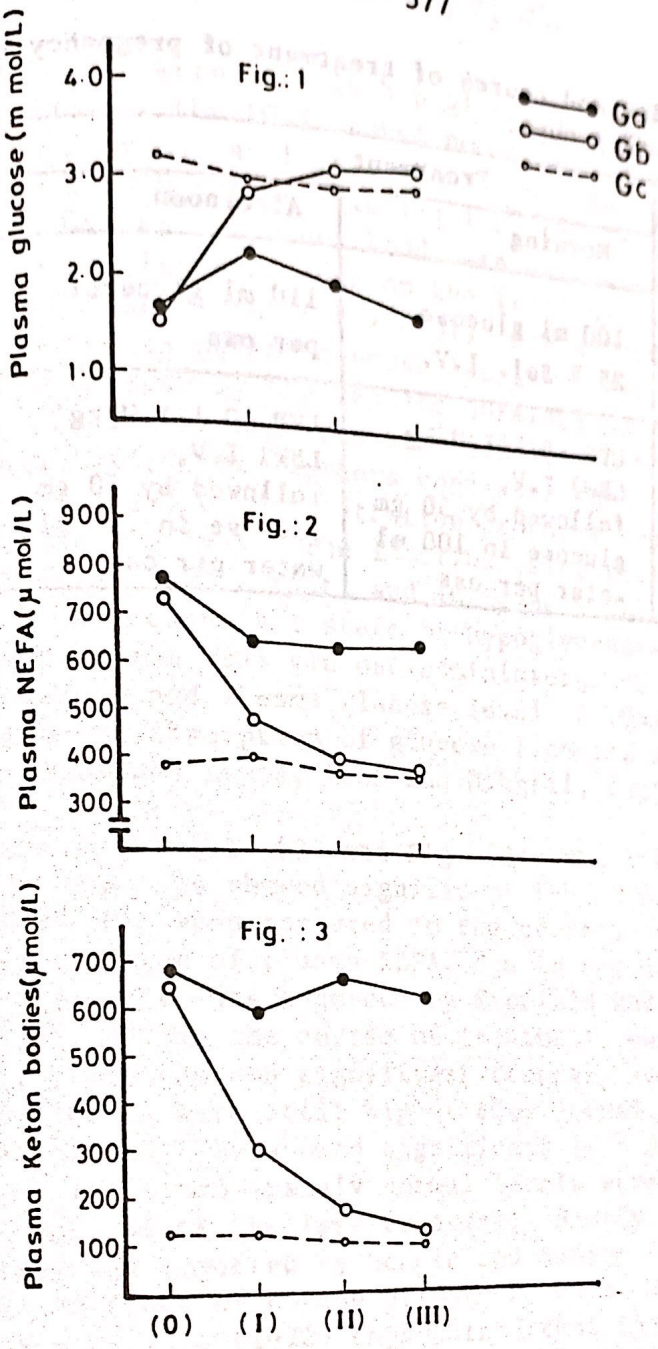
Group	Treatment		Cource
	Morning	Afternoon	
Ga	100 ml glucose 25 % Sol. I.V.	100 ml glycerol per oss	Three days
Gb	LVP (0.1 I.U/kg LBW) I.V. followed by 50 gm glucose in 100 ml water per oss	LVP (0.1 I.U/kg LBW) I.V. followed by 50 gm glucose in 100 ml water per oss	Three days

RESULTS AND DISCUSSION

In the first group (Ga), two of the fore-mentioned ewes (case No.1 and 4) were recovered soon after lambing on the third and fifth day after the last tratment with replacement therapy. Four lambs were borned, two weak alive; and one alive and one dead respectively. Although there were no clinical improvement in the appetite and general health, lambing seemed to be the crucial factor. Case No. 3 recovered only after induction of abortion and two still-birthes were removed. Case No. 2 died after recieving the last treatment. At necropsy, two dead foeti were present in the uterus and sever fatty degneration of the liver was found.

Three out of the 4 ewes in the second group (Gb) showed an improved appetite 24 hours after the first treatment with oral glucose. Clinical recovery was achieved within 1-2 days after the last treatment. The three ewes were recovered completely before lambing; 16 days (case No. 5, alive twins), 12 days (case No. 6, alive twins) and 7 days (case No. 8, one alive and one dead lamb). The remaining ewe (case No. 7) showed only temporary improvement of appetite and appeared to be dull. Complete clinical recovery was achieved after induction of abortion 3 days after the last treatment, and two dead lambs were removed.

The obtained values for plasma glucose, NEFA and total keton bodies for the control animals were 3.20±0.3 m mol/L, 380.5 ± 10.5 μ mol/L and 120.0 ± 5.8 μ mol/L respectively. Nearly similar results were reported by Blood & Radostitis (1989), and Ried and Hinks (1962) for healthy pregnant ewes. On the first examination, before treatment, ewes of both groups were hypoglycaemic as they showed significant ($p > 0.01$) decrease of plasma glucose level when compared with healthy control one as shown in Table (2) and Fig. (1). It was reported by Kronfeld and Simsen (1961) that the mild



Plasma levels of glucose (Fig.1), NEFA (Fig.2) and Keton bodies(Fig.3) during the course of treatment of pregnancy toxaemia in ewes.

Table (1): Plan and cource of treatment of pregnancy toxaemia in both groups.

Group	Treatment		Cource
	Morning	Afternoon	
Ga	100 ml glucose 25 % Sol. I.V.	110 ml glycerol per oss	Three day
Gb	LVP (0.1 I.U/kg LBW) I.V, followed by 50 gm glucose in 100 ml water per oss	LVP (0.1 I.U/kg LBW) I.V, followed by 50 gm glucose in 100 ml water per oss	Three day

field cases were usually hypoglycaemic. After treatment, ewes of the (Ga) showed non significant rise of plasma glucose, at first, then it decreased to the prelimenary hypoglycaemic level on the last day of treatment. On the other hand ewes of the(Gb)showed increased plasma glucose on the first day, then maintained significant (P > 0.01) rise afterwords. The difference in palsma glucose level between both groups were explained by the results obtained by Medway et al., (1974), Parasad and Kaul (1981) and Scholz and Rehage (1987). The authers concluded that the route of I.V. glucose administration produces transient hyperglycaemia, lessen the insuline release,arrest the hepatic glucose output and increase renal glucose losses. Consequently a state of hypoglycaemia developed than does the oral glucose administeration. Moreover, the maintained plasma glucose level in (Gb) due to the continuous absorption of glucose from the abomasum (Mc Allan and Lewis, 1985 and Mikhail, 1986).

As shown in Table (2) and Fig. (2), the affected ewes of both groups showed significant (P > 0.01) rise of plasma NEFA when compared to the control one. A high concentration of plasma NEFA, due to accelerated gluconeogenesis, was recorded by Kronfeld and Raggi (1966). During the course of treatment, ewes of the (Ga) exhibited non significant changes, as the plasma NEFA levels were still higher than normal. Meanwhile ewes of the (Gb) showed significant (P > 0.01) reduction and approximately normal levels were reached 24 hours after the last treatment. Nearly similar findings was reported by Scholz and Rehage (1987) in the treatment of bovine primary ketosis. Moreover Medway et al., (1974) emphathized that feeding of glucose appears to depress the plasma NEFA.

Before treatment, the diseased ewes exhibited hyperketonaemia as the plasma total keton bodies significantly (P > 0.01) increased than normal as shown in

Table (2): Plasma levels of glucose, NEFA and total keton bodies during the course of treatment of pregnancy toxaemia in ewes.

Plasma concentrations (Mean ± S.E.)	Group	(0) Before treatment	(I) 24 hours after the first treatment	(II) 24 hours after the second treatment	(III) 24 hours after the last treatment
Glucose (m mol/L)	Ga	1.60± 0.1*	2.25± 0.3	1.93± 0.2	1.75± 0.1*
	Gb	1.48± 0.1*	2.87± 0.1	3.21± 0.3	3.34± 0.1*
	Gc	3.20± 0.3*	2.96± 0.2	2.98± 0.1	3.10± 0.2*
NEFA (μ mol/L)	Ga	772.51±26.3*	637.5 ±59.6	642.5 ±40.8	646.7 ±22.8*
	Gb	725.0 ±30.3*	482.5 ±30.9	402.0 ±28.4	383.7 ±31.8*
	Gc	380.5 ±10.5*	400.8 ±16.2	370.4 ±12.0	370.8 ± 8.5*
Keton bodies (μ Mol/L)	Ga	680.0 ±27.1*	587.5 ±24.6	665.0 ±26.6	630.0 ±38.4*
	Gb	652.5 ±18.5*	292.5 ±25.5	166.2 ±39.5	123.7 ± 9.2*
	Gc	120.0 ± 5.8*	120.8 ± 7.4	100.9 ±10.5	110.0 ± 6.2*

* Significant difference at ($P > 0.01$).

Table (2) and Fig. (3). A positive simple correlation between plasma NEFA and total keton bodies in field cases were reported by Radloff et al., (1966). Ewes of the (Gb) showed significant ($P > 0.01$) decrease of plasma keton bodies 24 hours after the first treatment, a low level was reached by all ewes 24 after the last treatment. On the other hand ewes of the (Ga) showed non significant changes as the level of keton bodies remain higher than normal.

In response to the methods of treatment, 50% of the diseased ewes in(Ga)recovered because of lambing. On the other hand 75% of the affected ewes in Gb get recovered befor labming because of the correction of blood glucose, NEFA, and keton bodies concentrations. The obtained evidences from the present trial indicates that the oral glucose administeration, after premedication with LVP to induce oesophageal groove closure, may be an efficient method in the treatment of moderated cases of pregnancy toxaemia in ewes.

SUMMARY

Treatment of pregnancy toxaemia was carried out in two groups of diseased ewes, four animals each. The first group (Ga) was treated with the standard replacement therapy; I.V. glucose followed by oral glycerol as a glucogenic substance. The second group (Gb) was treated with oral glucose after pre-medication with lysine vasopressin® (LVP) to induce oesophageal groove closure. Both treatments were given twice a day for three successive days. Response of treatments and recovery were monitored daily through clinical and biochemical examinations. Twenty four hours after the last treatment ewes of the first group (Ga) showed

* Lysine-vasopressin (Lypressin INN rec for synthetic 8 lysine-vasopressin) supplied from Sandoz® as ampules of 1 ml contains 10 I.U/ml.

neither clinical nor significant biochemical improvement, but lambing or induction of abortion was the crucial factor. On the other hand 3 out of 4 ewes of the second group (Gb) showed an improved appetite twenty four hours after the first treatment, and complete recovery was achieved before lambing. Recovery was accompanied with significant ($p > 0.01$) increase of plasma glucose and decrease of plasma NEFA and total keton bodies.

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