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Therapeutic trials of various therapeutic regimn on ketosis in cows

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Abstract
The present investigation has undertaken to compare the efficacy of different therapeutic regimen in 40 ketotic cows. All the 40 ketotic animals equally divided into gr A, B and C received received Isoflud (Isoflupredone Acetate) @ 20 mg per animal along with 50 per cent dextrose 500 ml was given on 1st day, 50 per cent dextrose 500 ml intravenously was given on 2nd day. Isoflud @ 20 mg per animal along with 50 per cent dextrose 500 ml intravenously was given on 3rd day. Group B (n=15) received Decadurabolin (Nandrolone Decanoate) @ 100 mg per animal with 50 per cent dextrose 500 ml was given on 1st day, 50 per cent dextrose 500 ml intravenously was given on 2nd day, Decadurabolin (Nandrolone Decanoate) 100 mg per animal with 50 per cent dextrose 500 ml intravenously was given on 3rd day. Group C (n=10) showing glycosuria were given Human Actrapid (Insulin) containing 40 IU per ml as per the values of serum glucose. Comparative efficacy of treatment trial on the basis of various biochemical parameters concludes that the cases which were treated with Decadurabolin (Nandrolone) associated with parenteral glucose gave excellent recovery than Isoflud (Isoflupredone Acetate)

Keywords: Cow, ketosis, biochemical parameters, treatment

Introduction
High incidence of clinical and subclinical ketosis causes economic loss to the dairy farmers due to loss of milk production as well as sharp drop in the SNF content of milk and failure of affected animals to return to normal production after recovery (Radostits *et al*., 2000) [15]. Ketosis is a major metabolic disorder caused by negative energy balance, characterized by relatively high concentrations of ketone bodies with a concurrent decrease in blood glucose levels. A dramatic increase in energy requirements during late pregnancy and early lactation makes dairy cows highly susceptible to negative energy balance. (Youssef *et al*., 2010) [22].The pathogenesis of the condition has been a subject of controversy (Baird, 1982) [2] and has not been fully elucidated. Ketosis was described as being a disorder of carbohydrate metabolism (Kreb, 1966) [11], deficiency of cobalt and vitamin B_{12} (Hungerford, 1990) [8], impaired metabolism of volatile fatty acids (Sarode *et al*., 1981) [17], high protein diet, over feeding in late pregnancy (Baird *et al*., 1974) [3], excessive intake of butyrate in silage (Mills *et al*., 1986) [12], hepatic insufficiency (Radostitis *et al*., 2000) [15], dysfunction of adrenal and thyroid gland (Huszenicza *et al*., 2006) [9]. The disease itself is being secondary to other diseases (Han and Kim, 2005) [6].

The treatment of ketosis possesses a challenge to veterinarians. Several treatments for clinical ketosis like glucose injection, glucose plus insulin, corticosteroids, anabolic steroids, oral administration of sodium propionate, propylene glycol and nicotinic acid have been reported (Radostitis *et al*., 1994) [14]. The treatment with dextrose in several clinical cases of bovine ketosis was not found satisfactory and up to 50 per cent cows required glucose administration for several weeks. Corticosteroids resulted in reduction in milk yield and appetite (Hungerford, 1990) [8] as it decreased the uptake and utilization of glucose by peripheral and mammary tissues and there were frequent relapses too (Andrews *et al*., 1992) [1]. Anabolic steroid like Trenbolone acetate @ 60 mg and 120 mg as single injection were reported to be effective in treatment of clinical and experimental ketosis in cows (Heitzman and Walker, 1973) [7] but no extensive field trials had been recorded (Radostitis *et al*., 1994) [14].

Several therapeutic agents for ketosis in cows including glucose injections (Hamada *et al*., 1982) [5], corticosteroids (Tsvetkov *et al*., 1988; Kegl, 1992) [21, 10] have been reported. Rings (1985) [16] recommended infusion of concentrated glucose solution with insulin as an efficacious therapy causing speedy recovery in cases of bovine ketosis. Muyelle *et al*., (1991) [13] found intraperitonial administration of glucose 1 gm/kg body weight to given satisfactory result for treatment of ketotic dairy cows.

Bovine ketosis is of substantial economic significance and has been found to be responsible for decline in milk production even two weeks before its clinical appearance. Major economic losses have been attributed to the loss of milk yield and failure of the animals to return to the peak production potential even after recovery in clear cut cases of ketosis. (Teli and Ali, 2007) [20].

Keeping in view the importance of high producing cattle, their feeding practices and management pattern adopted by farmers, present investigation on therapeutic studies on ketotic cows has been undertaken. Present paper reports comparative efficacy of different therapeutic regimen in the management of ketosis in cows.

Materials and Methods

The present study was conducted in the forty post-parturient cows showing clinical signs of ketosis and the urine of which was positive for Modified Rothera's test and urine Diastix belonging to the college dairy farm, outdoor patients brought for treatment at medicine clinic of College of Veterinary and Animal Science, Bikaner and individual animals shown by owners at their holdings in and around Bikaner. The ketotic animals under treatment were divided into three groups:

i) Group A (n=15) received Isoflud (Zydus AHL) containing Isoflupredone Acetate (2 mg/ml) @ dose rate of 20 mg per animal along with 50 per cent dextrose 500 ml was given on 1st day.

50 per cent dextrose 500 ml intravenously was given on 2nd day.

Isoflud in the doses mentioned earlier along with 50 per cent dextrose 500 ml intravenously was given on 3rd day.

ii) Group B (n=15) received Decadurabolin (Cadilla Health Care Ltd.) containing Nandrolone Decanoate 100 mg per animal with 50 per cent dextrose 500 ml was given on 1st day.

50 per cent dextrose 500 ml intravenously was given on 2nd day.

Decadurabolin in the doses mentioned earlier along with 50 per cent dextrose 500 ml intravenously was given on 3rd day.

iii) Group C (n=10) showing glycosuria were given Human Actrapid (Insulin) containing 40 IU per ml as per the values of serum glucose as mentioned below:

Serum Glucose:	Dose of insulin:
60 – 80 mg/dl:	80 IU insulin subcutaneously
80 – 100 mg/dl:	120 IU insulin subcutaneously
100 – 120 mg/dl:	160 IU insulin subcutaneously
Above 120 mg/dl:	200 IU insulin subcutaneously

The 1st dose of insulin was given with 500 ml of 50 per cent dextrose while the 2nd dose was given without dextrose if the animal under treatment had previously completed treatment with 3 infusions of 50 per cent dextrose (one bottle of 500 ml of 50 per cent dextrose per day).

The blood samples were collected in sterilized test tubes from jugular vein from forty ketotic and ten healthy cows keeping all aseptic precautions. The blood slants were made and incubated for 1 hour at 30°C. Blood clots were broken and tubes were centrifuged at 2300 r.p.m. for 30 minutes. The serum was pipetted out in small pyrex tubes and was kept immediately in the deep freeze at -20°C till analysis. Fresh urine samples were collected directly in sterile vials after massaging the perineal region of the cow to test the urine for the presence of ketone bodies.

Statistical Methods

The data obtained in the research work undertaken were statistically analyzed and compared using standard formula given for mean, standard error and analysis of variance as per the procedures explained by Snedecor and Cochran (1987) [18]. Multiple comparisons of the means were done by using Duncan's new multiple range tests as described by Steel and Torrie (1980) [19].

Results and Discussion

1) Group A: Out of a total of 15 cases in group A: 3 cases showed Rothera's "++" which recovered on 2nd day. Out of 10 cases showing Rothera's "+++", seven recovered on 3rd day while the rest of 3 cases recovered on 4th day. Rest of the 2 cases showing Rothera's "++++" recovered on 4th day. The cases which recovered on 4th day were given a 2nd dose of Isoflud.
2) Group B: Out of a total of 15 cases in group B: 4 cases showed Rothera's "++" which recovered on 2nd day. Out of 10 cases showing Rothera's "+++", 6 recovered on 3rd day while 1 case recovered on 4th day. Rest of the 4 cases showing Rothera's "++++" recovered on 3rd day. 1 case which recovered on 4th day was given a 2nd dose of Decadurabolin.
3) Group C: In group A 6 cases showed glycosuria and similarly 4 cases in group B showed glycosuria. These 10 cases of group C did not respond to previous treatment and were considered to be Insulin dependent cases. Such cases were immediately switched on to treatment with 50 per cent dextrose and Insulin or Insulin alone. Results are presented also in appendix XV and XVI.

Comparative efficacy of different treatment for the treatment of bovine ketosis (Table 1, 2, 3, 4, 5, 6)

Table 1: Biochemical parameters in Ketotic cows (Before Treatment). (n = 15). Isoflud Group

S.No.	Serum Glucose mg/dl	Serum Ketones mg/dl	Urine Ketones mg/dl	T.P. g/dl	Alb. g/dl	Glb. g/dl	Insulin µIu/ml	Cortisol ng/ml	Serum Chole-Sterol mg/dl	Serum Trigly-Cerides mg/dl	Serum total Lipids mg/dl	AST IU/L	ALT IU/L	Ca mg/dl
1	33.30	10.56	32.98	10.88	4.92	5.96	10.56	3.87	113.30	75.16	279.54	98	82	6.23
2	29.10	14.24	25.32	11.92	3.94	7.98	9.64	2.90	117.10	71.22	265.51	94	40	6.51
3	31.90	8.25	29.27	9.35	4.83	4.52	9.15	3.05	156.60	75.31	270.73	91	39	7.23
4	40.00	10.98	30.77	11.38	4.70	6.68	12.03	4.77	111.21	74.23	260.42	95	45	6.39
5	36.49	8.14	26.58	9.30	3.27	6.03	11.59	4.45	102.65	76.73	220.32	89	61	6.18
6	28.25	10.24	20.47	8.96	3.71	5.25	10.00	3.79	185.47	77.81	280.18	96	28	6.31
7	41.02	11.20	29.72	9.67	4.25	5.42	12.22	3.17	165.38	73.65	270.37	98	39	7.94
8	42.56	7.84	25.92	10.65	4.65	6.00	8.75	3.51	192.10	76.43	255.96	97	65	6.72
9	35.30	10.28	22.96	9.98	3.27	6.71	7.80	4.50	139.63	65.30	275.23	96	59	6.58
10	39.00	10.89	24.65	10.00	4.67	5.33	11.01	3.59	154.80	75.31	284.35	93	68	8.63
11	42.76	10.22	20.86	8.57	3.76	4.81	13.11	4.00	133.16	79.65	277.61	84	72	7.92
12	32.35	11.22	19.22	11.45	4.07	7.38	14.00	3.65	187.18	76.94	289.22	96	58	8.00
13	34.11	10.34	23.21	10.89	5.91	4.98	10.53	3.26	174.33	69.68	275.83	99	70	8.56
14	35.00	10.03	30.00	11.56	4.98	6.58	11.28	3.19	142.50	78.00	279.74	96	69	7.95
15	30.72	11.87	19.54	10.66	4.00	6.66	9.20	4.47	122.64	77.30	284.62	90	61	6.90
Mean ± SE	35.46±1.22	10.42±0.41	25.43±1.14	10.35±0.27	4.33±0.18	6.02±0.24	10.72±0.44	3.74±0.15	146.54±7.71	74.85±0.95	271.31±4.34	94.13±1.05	57.07±3.97	7.20±0.23
Range	28.25-42.76	7.84-14.24	19.22-32.98	8.57-11.92	3.27-5.91	4.52-7.98	7.80-14.00	2.90-4.77	102.65-192.10	65.30-79.65	220.32-289.22	84-99	28-82	6.18-8.63

Table 2: Biochemical parameters in Ketotic cows (After Treatment). (n = 15). Isoflud Group

S. No.	Serum Glucose mg/dl	Serum Ketones mg/dl	Urine Ketones mg/dl	T.P. g/dl	Alb. g/dl	Glb. g/dl	Insulin µIu/ml	Cortisol ng/ml	Serum Chole-Sterol mg/dl	Serum Trigly-Cerides mg/dl	Serum total Lipids mg/dl	AST IU/L1	ALT IU/L	Ca mg/dl
1	52.17	1.52	2.30	7.06	3.60	3.46	11.25	3.72	110.12	49.35	238.51	78.10	33.16	9.05
2	47.91	1.94	2.87	7.61	4.14	3.47	10.37	4.91	109.56	46.80	270.10	100.80	32.97	7.58
3	48.29	1.03	1.65	8.41	3.48	4.93	9.80	5.40	139.21	53.71	255.27	78.51	40.00	8.00
4	50.82	1.35	2.21	7.26	4.24	3.02	13.50	4.78	105.53	54.02	256.95	69.22	32.65	8.67
5	52.34	1.75	1.74	8.72	4.13	4.59	12.17	4.61	100.79	56.46	275.14	85.36	37.25	8.78
6	49.61	1.25	2.68	7.40	3.16	4.24	12.10	3.24	149.74	48.08	265.81	90.01	38.03	8.02
7	52.36	1.42	2.90	6.90	3.95	2.95	12.72	5.00	129.18	58.00	234.36	53.96	36.87	8.00
8	54.36	1.50	1.94	7.55	4.12	3.43	10.63	4.85	159.73	51.60	266.61	60.92	34.71	8.75
9	50.00	1.77	2.74	8.15	3.54	4.61	12.00	4.99	125.13	59.02	240.18	71.26	35.25	8.80
10	50.83	1.56	2.00	7.99	4.65	3.34	13.22	5.25	129.00	54.20	261.22	53.84	36.02	8.98
11	52.26	1.45	2.75	9.25	2.99	6.26	10.37	4.70	121.34	52.65	255.38	67.13	39.31	9.06
12	52.62	1.32	1.86	8.21	3.74	4.47	9.99	4.87	155.46	57.98	259.34	60.17	40.95	9.28
13	52.14	1.78	2.95	7.86	4.12	3.74	10.00	4.94	140.86	52.23	252.40	69.97	35.63	9.32
14	56.72	1.47	2.34	7.54	3.84	3.70	10.07	4.36	120.73	54.83	269.28	70.35	31.92	8.54
15	53.26	1.59	2.65	8.53	3.98	4.55	11.20	4.61	105.00	49.70	253.64	71.19	37.54	8.95
Mean ± SE	51.71±0.58	1.51±0.06	2.37±0.12	7.90±0.17	3.84±0.11	4.05±0.23	11.29±0.32	4.68±0.14	126.76±4.90	53.24±0.96	256.95±3.10	72.05±3.36	36.15±0.71	8.65±0.13
Range	47.91-56.72	1.03-1.94	1.65-2.95	6.90-9.25	2.99-4.65	2.95-6.26	9.80-13.50	3.24-5.40	100.79-159.73	46.80-59.02	234.36-275.14	53.84-100.80	32.65-40.95	7.58-9.32

Table 3: Biochemical parameters in Ketotic cows (Before Treatment). (n = 15) Deca-durabolin Group

S. No.	Serum Glucose mg/dl	Serum Ketones mg/dl	Urine Ketones mg/dl	T.P. g/dl	Alb. g/dl	Glb. g/dl	Insulin µIu/ml	Cortisol ng/ml	Serum Chole-Sterol mg/dl	Serum Trigly-Cerides mg/dl	Serum total Lipids mg/dl	AST IU/L	ALT IU/L	Ca mg/dl
1	38.72	8.00	30.12	12.86	4.84	8.02	9.73	3.99	151.65	63.22	285.90	98.15	49.36	8.07
2	36.22	8.12	29.92	9.75	3.98	5.77	9.51	4.12	139.00	75.54	280.98	98.20	52.58	6.98
3	41.12	15.35	18.67	11.40	5.06	6.34	10.66	3.84	156.60	79.49	289.71	89.23	74.29	6.60
4	40.25	8.90	27.68	10.68	5.32	5.36	11.87	4.69	141.21	80.21	270.23	99.89	64.00	7.93
5	41.68	9.52	25.69	12.24	4.01	8.23	9.60	3.74	102.65	74.98	289.55	90.90	83.25	7.06
6	36.36	10.30	19.31	13.01	4.56	8.45	13.27	3.00	145.47	81.65	287.99	90.10	70.51	8.01
7	38.97	16.34	29.57	10.28	4.28	6.00	7.89	4.57	155.38	78.99	290.15	99.86	59.53	7.45
8	36.00	9.38	28.21	10.99	3.58	7.41	11.47	3.98	192.10	81.55	284.57	94.23	52.36	7.00
9	35.58	9.92	30.00	13.09	3.42	9.67	12.17	2.77	139.63	75.69	290.00	83.31	74.19	6.74
10	35.20	10.95	31.89	11.77	5.92	5.85	10.01	3.68	154.80	80.00	286.64	99.47	32.58	7.12
11	27.19	10.90	30.92	9.82	3.30	6.52	11.20	4.50	133.16	56.51	250.88	90.48	54.55	6.98
12	36.60	11.55	20.58	11.83	6.23	5.60	13.99	4.00	187.18	79.89	290.05	95.27	29.63	7.00
13	37.51	10.25	25.62	11.84	5.49	6.35	10.65	3.79	174.33	78.78	288.66	98.00	51.67	6.25
14	41.48	11.00	22.24	10.86	4.96	5.90	9.67	4.36	142.50	81.40	250.99	98.32	29.87	7.50
15	29.82	12.64	27.84	12.99	4.87	8.12	12.64	4.61	182.64	78.59	290.14	90.84	36.02	6.51
Mean ± SE	36.85±1.05*	10.87±0.61	26.55±1.13	11.56±0.29	4.65±0.23	6.91±0.34	10.95±0.42	3.98±0.14	153.22±6.04	76.43±1.85	281.76±3.50	94.42±1.29	54.29±4.40	7.15±0.14
Range	27.19-41.48	8.00-16.34	18.67-31.89	9.75-13.09	3.30-6.23	5.36-9.67	7.89-13.99	2.77-4.69	102.65-192.10	56.51-81.65	250.82-290.15	83.31-99.89	29.63-83.25	6.25-8.07

Table 4: Biochemical parameters in Ketotic cows (After Treatment). (n = 15) Deca-durabolin Group

S. No.	Serum Glucose mg/dl	Serum Ketones mg/dl	Urine Ketones mg/dl	T.P. g/dl	Alb. g/dl	Glb. g/dl	Insulin µIu/ml	Cortisol ng/ml	Serum Chole-Sterol mg/dl	Serum Trigly-Cerides mg/dl	Serum total Lipids mg/dl	AST IU/L	ALT IU/L	Ca mg/dl
1	49.20	1.33	1.61	8.01	3.25	4.76	10.47	4.40	113.30	50.32	235.47	45.51	29.81	8.97
2	55.68	1.24	1.59	9.13	3.39	5.74	11.53	5.78	101.26	54.02	220.36	40.95	29.55	9.10
3	54.46	1.87	2.00	7.45	4.23	3.22	11.09	5.00	126.60	46.29	240.58	70.99	33.01	9.85
4	53.69	1.12	2.14	7.36	4.02	3.34	12.21	4.82	111.21	51.33	225.20	67.95	30.05	7.69
5	52.99	1.27	1.99	8.64	3.82	4.82	10.20	4.79	102.55	53.69	221.84	84.57	35.00	9.50
6	55.50	1.40	1.58	6.65	3.81	2.84	13.27	5.50	115.45	45.33	215.67	80.00	29.50	7.99
7	52.64	1.30	1.79	9.00	3.04	5.96	10.35	5.68	111.64	55.50	239.59	69.21	29.99	9.78
8	55.04	1.51	2.17	8.30	3.17	5.13	13.55	5.20	159.95	49.99	231.52	85.02	31.01	9.92
9	48.12	1.18	1.60	7.64	2.98	4.66	12.05	4.88	110.66	47.98	227.81	39.60	29.50	9.90
10	54.72	1.09	1.94	7.60	3.29	4.31	12.00	4.99	117.82	49.00	225.50	81.10	30.31	10.00
11	53.32	1.07	2.14	7.96	4.21	3.75	13.61	5.58	133.06	55.90	247.68	75.42	31.12	9.58
12	49.47	1.16	2.01	8.03	3.33	4.70	13.80	5.73	134.74	49.94	252.31	66.81	35.57	9.98
13	55.82	1.11	1.96	7.54	4.25	3.29	10.97	4.90	102.00	55.03	268.59	71.55	30.00	9.80
14	51.00	1.98	1.85	6.99	3.60	3.39	10.20	3.38	101.50	54.28	231.94	85.47	29.59	8.65
15	53.21	1.48	1.88	9.02	4.00	5.02	11.43	5.47	122.64	54.34	240.40	74.03	29.61	9.05
Mean ± SE	52.99±0.64	1.34±0.07	1.88±0.05	7.95±0.19	3.63±0.12	4.33±0.25	11.78±0.33	5.07±0.16	117.62±4.13	51.53±0.88	234.96±3.58	69.21±3.98	30.91±0.52	9.32±0.19
Range	48.12-55.82	1.07-1.98	1.55-2.17	6.65-9.13	2.98-4.25	2.84-5.96	10.20-13.80	3.38-5.78	101.26-159.95	45.33-55.90	215.67-268.59	39.60-85.47	29.50-35.57	7.69-10.00

Table 5: Biochemical parameters in insulin dependent ketotic cows (Before Treatment) (n=10)

S. No.	Serum Glucose mg/dl	Serum Ketones mg/dl	Urine Ketones mg/dl	T.P. g/dl	Alb. g/dl	Glb. g/dl	Insulin μIu/ml	Cortisol ng/ml	Serum Chole-Sterol mg/dl	Serum Trigly-Cerides mg/dl	Serum total Lipids mg/dl	AST IU/L	ALT IU/L	Ca mg/dl
1	75.29	12.70	32.15	11.72	5.70	6.02	3.21	4.01	160.33	59.94	255.15	78	36	10.90
2	44.62	7.96	15.21	12.09	4.92	7.17	5.10	5.70	135.09	61.18	265.00	89	44	9.22
3	59.41	12.02	31.55	12.35	5.60	6.75	4.35	4.09	144.10	60.85	280.66	109	81	7.29
4	32.50	11.70	29.00	9.21	3.90	5.31	3.10	4.50	118.95	76.60	278.12	105	60	9.11
5	33.70	11.66	25.37	11.83	5.76	6.07	7.00	3.90	156.40	97.94	245.28	76	71	9.27
6	36.22	9.29	27.46	12.00	5.44	6.56	6.29	5.28	177.51	88.00	250.50	88	58	7.24
7	41.00	9.22	21.00	9.78	3.40	6.38	7.30	5.37	157.92	79.99	259.90	89	81	9.21
8	35.67	10.07	24.74	11.80	5.78	6.02	4.81	4.70	159.78	95.24	278.39	80	72	9.47
9	32.70	10.90	30.40	11.53	4.36	7.17	4.77	4.55	125.41	91.08	282.57	85	70	8.93
10	33.68	11.00	30.00	11.09	4.45	6.64	4.23	4.80	169.48	89.67	270.80	84	69	8.90
Mean ± SE	42.48±4.48	10.65±0.47	26.69±1.68	11.34±0.33	4.93±0.27	6.41±0.18	5.02±0.46	4.69±0.19	150.50±6.02	80.05±4.68	266.64±4.26	88.30±3.44	64.20±4.70	8.95±0.33
Range	32.50-75.29	7.96-12.70	15.21-32.15	9.21-12.35	3.40-5.78	5.31-7.17	3.10-7.30	3.90-5.70	118.95-177.51	59.94-95.24	245.28-282.57	76-109	36-81	7.24-10.90

Table 6: Biochemical parameters in insulin dependent ketotic cows (After Treatment) (n=10)

S. No.	Serum Glucose mg/dl	Serum Ketones mg/dl	Urine Ketones mg/dl	T.P. g/dl	Alb. g/dl	Glb. g/dl	Insulin μIu/ml	Cortisol ng/ml	Serum Chole-Sterol mg/dl	Serum Trigly-Cerides mg/dl	Serum total Lipids mg/dl	AST IU/L	ALT IU/L	Ca mg/dl
1	46.31	1.20	2.11	9.25	4.80	4.45	9.45	5.00	120.00	53.69	260.60	69	21	11.95
2	52.41	1.30	1.78	9.15	3.78	5.37	10.51	4.10	105.45	55.23	210.08	71	29	10.45
3	43.00	1.24	2.16	8.02	3.98	4.04	10.00	5.73	109.90	47.25	259.65	70	40	11.77
4	52.11	1.15	2.19	8.13	2.03	6.10	9.67	5.56	118.31	66.87	240.95	79	41	10.90
5	48.20	1.09	2.26	8.21	3.71	4.50	13.78	4.71	134.85	58.64	225.00	59	46	10.00
6	51.37	1.20	1.51	8.15	3.82	4.33	10.23	4.20	115.71	60.00	219.85	66	24	9.36
7	51.26	1.26	2.17	7.91	2.31	5.60	11.77	4.45	125.57	58.92	270.94	70	43	9.67
8	49.32	1.11	2.26	8.31	3.71	4.60	8.97	5.17	110.19	53.87	263.59	58	47	10.09
9	51.80	1.25	1.73	8.32	3.80	4.52	11.00	5.90	114.74	56.47	242.16	67	38	11.00
10	55.00	1.75	2.28	8.50	3.90	4.60	10.44	4.91	103.81	55.00	230.67	67	39	10.07
Mean ± SE	50.08±1.10	1.25±0.06	2.04±0.08	8.39±0.14	3.58±0.26	4.81±0.21	10.58±0.43	4.97±0.20	115.85±2.98	56.59±1.61	242.35±6.57	67.60±1.90	36.80±286	10.53±0.27
Range	43.00-55.00	1.09-1.75	1.51-2.28	7.91-9.25	2.03-4.80	4.04-6.10	8.97-13.78	4.10-5.90	103.81-134.85	47.25-66.87	210.08-270.94	58-79	21-47	9.36-11.95

Comparative efficacy of treatment trial concludes that the cases which were treated with Decadurabolin recovered more satisfactorily than Isoflud group. In this present study Decadurabolin is better drug of choice than Isoflud. Insulin was given where the ketotic animals showed glycosuria and was deficient in Insulin. So Insulin therapy is advised where there is deficiency of Insulin and not merely for enhancing glucose absorption.

The Diastix were +ve ("+") for glucose when the serum glucose was 79.82 to 96.82 mg/dl. Glycosuria has been reported to occur above 74 mg/dl of serum glucose by Bihani (2001) [4] reported that glycosuria can occur above 98 mg/dl.

Conclusion

From this study, it can be concluded that group treated with Decadurabolin (Nandrolone Decanoate) in association with parenteral dextrose give excellent recovery rate.

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