بعض الدراسات على الكفاءة الوظيفية للبنكرياس فى الأبقار والجاموس
١ ـ تأثير الجنس والعمر والنوع

م. حسن ، س. العمروسى ، أ. عامر

شملت هذه الدراسة ٢٠٥ حيوانا سليما اكلينيكيا (ذكر وأنثى) من الأبقار والجاموس يتراوح أعمارها بين ٤٠ يوم الى ١٢ سنة حيث تم تحليل سيرم الدم لهذه الحيوانات بهدف معرفة تأثير الجنس والنوع والعمر على الكفاءة الوظيفية للبنكرياس ولقد أظهرت الدراسة مايلى :

١ ـ ليس للنوع تأثير على مستوى الليبيز والاميليز والتربسين فى حين أن الجنس كان تأثيره ضعيفا بينما كان للعمر تأثير معنويا على مستوى الانزيمات .

٢ ـ ليس للجنس تأثير على مستوى أنزيمات الكبد فى حين أن مستوى هذه الانزيمات ازداد بتقدم العمر كما وأن دم الجاموس يحتوى على مستوى أعلى من هذه الانزيمات عنه فى الأبقار .

٣ ـ يحتوى دم الجاموس على نسبة عالية من الدهون الكلية والجلوكوز عنه فى الأبقار فى حين أن دم الأبقار كان يحتوى على نسبة أعلى من الجليسريدات والكوليسترول فى حين لم تحدث أية اختلافات بين الأبقار والجاموس فى مستوى البروتين الكلى .

٤ ـ كان تأثير الجنس ضعيفا أو معدوما على مستوى الدهون الكلى والبروتين الكلى والكوليسترول والجليسريدات والجلوكوز .

٥ ـ ارتفعت نسبة الدهون الكلى والكوليسترول والجليسريدات والجلوكوز بتقدم العمر فى حين أن العمر ليس له تأثير على مستوى البروتين الكلى .

Dept. of Medicine,
Faculty of Vet. Med., Assiut University,
Head of Dept. Prof. Dr. S. El-Amrousi.

SOME STUDIES ON PANCREATIC FUNCTION IN CATTLE AND BUFFALOES

1. SPECIES, SEX AND AGE DIFFERENCES

(With 3 Tables)

By

M.S. HASSAN, S. EL-AMROUSI and A.A. AMER.

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SUMMARY

Blood serum samples (205) were collected from clinically healthy cattle and buffaloes to establish the normal pancreatic function with regard to species, sex and age. Species differences were not detected in lipase, amylase and trypsin enzyemes levels. Sex played a minor role while age had a significant effect. Sex had no effect upon liver enzymes (S-GOT; S-GPT, alkaline and acid phosphatase) while they were increased by increasing age. Comperatively, buffaloes had a higher level of S-GOT and S-GPT, of total lipids and glucose than cattle. On the other hand cattle had higher levs of triglycerides and total cholesterol.

Sex seemed to exert neglicable or even no role on total lipids, cholesterol triglycerides and glucose. Aged animals had a higher levels of total lipids, total cholesterol, triglycerides and glucose while age seemed to play no role an total protein.

INTRODUCTION

Laboratory tests used in the diagnosis of the pancreatic diseases in monogastric domestic animals are described in the current literature and there were found to be applecable in dogs and cats. Yet it is rather diffecult to correlate results obtained in these speceis as a base of interpretation of the respective findings in cattle and buffalose. This situation arrouse the intrest for evaluation of the pancreatic function tests in cattle and buffalose with regard to sex, species and age.

MATERIALS AND METHODS

Blood, faeces, and duodenal fluid samples were collected from 205 male and female cattle and buffaloes with age ranging from 40 days up to 12 years. Data concerning the species are tabulated as follows:

Species	Sex	Age	No.
Cattle	Male	1.5 - 3.5 years	50
	Female	1.5 - 3.5 years	30
	Female	5.0 -12.0 years	20
Buffaloes	Male	Less than ½ year	25
	Male	1.5 - 3.5 year	30
	Female	5.0 -12.0 years	20

All animals prooved to be clinically healthy.

The optained serum samples were analysed for total protein (WEICHSEL-BAUM, 1946), lipids (ZOLLNER and KIRSCH, 1962), triglycerides (SOLONI, 1971), cholesterol (WATSON, 1960) and glucose (TRINDER; 1969), amylase (SMITH and ROE, 1949 and 1957), lipase (TIETZ and FIERECK,1966),GOT and GPT (REITMAN and FRANKEL, 1957), alkaline phosphatase (BESSEY et al. 1946) and acid phosphatase (FISHMAN et al.,1953) enzymes were determined. Faecal samples were used for qualitative determination of faecal fat (COFFIN, 1953) and trypsin (JASPER, 1954).

Duodenal fluid samples were analysed quantitatively for trypsin (ERLANGER et al., 1961).

Data obtained were statistically analysed (SNEDECOR, 1956).

RESULTS AND DISCUSSION

Table 1-3 sumarize the obtained data.

Amylase Enzyme:-

The serum amylase values decrease from 171.11 ± 29.7 to 47.78 ± 12.96 U/100ml by increasing age from 2 months till 3.5 years. The enzyme increases again to reach 51.28 ± 20.11 U/100 ml by increasing age from 3.5 - 12 years. Sex was found to infleuence the levels where level in female was higher (64.00 ± 11.35 U/100 ml) than males in the similar age (44.70±7.89 U/100 ml). There was no obvious changes detected in amylase enzyme between cattle and buffaloes in the same age and sex.

Lipase Enzyme:

The normal values of lipase enzyme were slightly higher in buffaloes than in cattle in different ages even between the same sex (Table 1). The enzyme was greatly affected by age as it decreased respectively from 1.5 to 1.0 ml of 0.05 N NaoH in animals aging ½ to 3½ years. With advanced age (3.5-12 years), the enzyme dropped from 1.0 to 0.85 ml of 0.05 N NaoH. No noticable variation in the level of lipase enzyme between male and female cattle and buffaloes in similar age.

Trypsin Enzymes:

Cattle and buffaloes had rather similar levels of the enzyme trypsin at the studied age. Variations between these two species seemed not to exist. Age on the other hand, influences trypsin levels, as it decreased by increasing age. The highest level of trypsin enzyme was found in young animals (18.74 ± 6.3 U/L) while the lowest level was recorded in older ones (12.8 ± 5.1 U/L) in both cattle and buffaloes.

As a conclusion, the present study revealed no obvious changes in pancreatic enzymes (amylase, lipase and trypsin) between cattle and buffaloes, where as sex play a minor role and only age had a significant effect. Unfortunately the available literaure lacks any information concerining normal data for pancreatic function tests in cattle and buffaloes, this makes discussion of present figures rather diffecult.

Liver Enzymes:

Table II shows that sex had no role in the metabolism of studied liver enzymes (S-GOT, S-GPT, S-alkaline and acid phosphatases). By increasing age in both cattle and buffaloes, levels of these enzymes increased (Table II). It was noticed also that there were great variations in the level of both S-GOT and S-GPT between cattle and buffaloes in the same age and sex. Buffaloes had a higher level of both enzymes than cattle. In the other side there was no great difference between cattle and buffaloes in the level of alkaline and acid phosphatases. The obtained results were in agreement with that reported by HAFEZ (1973) and HASSAAN (1977) in heathly buffaloes.

There was no difference between levels of serum total protein in both cattle and buffaloes. Sex and age seemed to play no role in their concentration (Table III).

Serum total lipids level was slightly higher in buffaloes than in cattle having nearily the same age and of similar sex. (Table III) This covers the different age groups of the studied animals. However,a slight increase in older animals was detected in both species (Table III) , whereas sex played insignificant role.

The normal level of total serum cholesterol was slightly higher in cattle than in buffaloes and in aged animal than younger anes (Table III).

The obtained results pointed that cattle had a higher level of serum triglycerides than in buffaloes in all normal studied ages (-Table III). Young animals had higher levels of triglycerides than older ones in both species. Yet with advanced age the levels were insignificantly raised. One could trace this behaviour in the middle and old aged animals, whereas sex exerted neglicable effect.

With regard to serum glucose level, it was concluded that healthy buffaloes have a higher level than cattle in the different age groups

studied. In old age levels of glucose were relatively higher, while sex seemed to have no role on its normal level in both species. Recorded figures, regarding the above mentioned organic constituents, were in agreement with that reported by WHITE et al., (1968) and LATNER, (1975).

Lastly one could say safely that this prilimenary data could help in inter pretation of biochemical changes in blood of cattle and buffaloes suffering from pancreatic dysfunction.

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Table (1): Normal Values of Serum Amylase, Serum Pancreatic Lipase and Trypsin In Duodenal Fluid In Male And Female Cattle and Buffaloes In Different Ages.

Animal Species	Sex	Age (Years)	Serum Lipase⊕ *ml 0.5 N NaoH	Surm Amylase⊕ u/100 ml	°Trypsin In D.F.⊕ U/L.
Cattle	Male	1.5 - 3.5 Years	0.68±0.35 (0.0 -1.5)	44.70±7.89 (30 - 60)	16.42±3.10 (11.3 - 24)
	Female	1.5 - 3.5 Years	0.75±0.41 (0.5 -1.5)	64.0 ±11.35 (42 - 84)	15.40±5.80 (14 - 22)
		5 - 12 Years	0.72±0.34 (0.5 -1.5	45.13±9.58 (56 - 84)	13.60±2.20 (10 - 16.2)
Buffaloes	Male	Less than ½ Year	1.50±0.35 (1.0 - 2.0)	171.11±29.70 (132 - 192)	18.74±6.30 (16 - 24)
		1.5 - 3.5 Years	1.00±0.32 (0.5 -1.5)	47.78±12.96 (35 - 70)	15.58±6.20 (13.7 -24)
	Female	5 - 12 Years	0.85±0.24 (0.5 -1.0)	51.28±20.11 (24 - 80)	12.80±5.1 (8 -28.3)

° D.F. : Duodenal fluid. ⊕ All were measured at 37°C.

* N.B. To Transfere ml 0.05 N NaoH to International units per liter (I.U/L) multiplying by 280.

Table II: Liver Enzymes In Male And Female Cattle and Buffaloes In Different Ages With Normal Pancreas.

Animal Species	Sex	Age (years)	GOT* U/L	GPT* U/L	Alkaline° Phosphatase U/L	Acid* Phosphatase U/L
Cattle	Male	1.5-3.2 years	19.38±3.52 (14-28)	6.84±1.74 (4-10)	38.09±10.49 (22-66)	2.12±0.87 (1-4)
	Female	1.5-3.5 years	19.38±3.07 (16-26)	6.32±1.56 (4-8)	40.62±12.96 (22-66)	1.91±0.19 (1-3)
		5 -12 years	28.38±5.60 (22 - 36)	14.31±3.33 (10-18)	38.13±8.59 (22-45)	4.29±0.89 (3-5.6)
Buffaloes	Male	Less than 0.5 years	30.94±6.09 (24 - 40)	3.11±1.18 (2-5)	77.33±15.21 (60-100)	4.72±1.08 (3.6-6.3)
		1.5-3.5 years	31.64±7.09 (28 - 40)	9.50±2.01 (6-13)	36.43±10.8 (22-44)	1.79±0.79 (1.0-3.0)
	Female	5-12 years	43.56±14.86 (22 - 70)	16.09±5.63 (5-26)	37.17±15.58 (16-60)	3.98±1.8 (2-8)

* N.B. Measurements at 37°C.

° Measurements at 25°C.

Table III: Serum Organic Constituents Of Male And Female Cattle And Buffaloes Of Different Ages With Normal Pancreass.

Animal Species	Sex	Age years	*Total Protein g/100 ml	°Total Lipids mg/100 ml	°Cholesterol mg/100 ml	*Triglycerides g/L	*Glucose mg/100
Cattle	Male	1.5-3.5 years	6.51±1.02 (5.3-8.6)	455.32±60.10 (300 - 550)	146.43±22.22 (112 - 180)	0.78±0.19 (0.55-1.15)	44.70±7.89 (30-60)
	Female	1.5-3.5 years	6.53±0.98 (5.3-8.6)	442.86±63.81 (300 - 550)	142.95±18.18 (120 - 176)	0.77±0.16 (0.5 -1.15)	44.20±8.02 (30-55)
Buffaloes	Male	Less than 0.5 years	7.62±1.25 (6.8-8.9)	635.29±192.65 (450 - 900)	163.94± 7.29 (110 - 210)	0.95±0.09 (0.8 -1.1)	84.17±7.67 (7.4-9.5)
		1.5-3.5 years	7.26±1.50 (5.5-8.6)	500.0 ± 155.53 (425 - 700)	135.50+05.12 (120 - 167)	0.47±0.12 (0.34-0.67)	64.0 ±6.88 (50-80)
	Female	5-12 years	7.95±3.13 (5.7-11.4)	530.0 ± 149.72 (300-800)	154.36±44.81 (590 - 240)	9.7 ±0.38 (0.2 -1.54)	69.88±17.10 (44-95)

* Measurements at room temperature. * Measurement at 37°C. ° Measurement at 25°C.