ANNALES
UNIVERSITATIS MARIAE CURIE-SKŁODOWSKA
LUBLIN – POLONIA
VOL. LIX, N 2, 144 SECTIO D 2004

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Serum total cholesterol, triglycerides and high density lipoproteins (HDL) levels in rabbit during the course of experimental diabetes

During the course of experimental diabetes disturbances in lipid metabolism are observed (1, 2, 3, 4, 5). Therefore, we decided to study serum levels of total cholesterol, triglycerides and high density lipoproteins in rabbit during the course of experimental diabetes.

MATERIAL AND METHODS

The study was conducted on 56 rabbits, of White New Zealand breed, male gender. The average weight of the rabbits was 3 kg. The diabetes was evoked by intravenous injection of 10% alloxan, using the single dose of 100 mg/kg. On the 7th day after administration of alloxan, serum glucose levels were determined. The serum glucose level higher than 11.1 mmol/l was considered an indicator of the presence of diabetes. All the animals included in the study were divided into five groups: Group 1 – the control – 14 rabbits, Group 2 – 21-day diabetes – 15 rabbits, Group 3 – 42-day diabetes – 10 rabbits, Group 4 – 90-day diabetes – 12 rabbits, Group 5 – 180-day diabetes – 5 rabbits. Serum total cholesterol, triglycerides and high density lipoproteins levels were determined with enzymatic methods using laboratory kits produced by P. Z. CORMAY CO.

RESULTS

In Table 1 serum total cholesterol levels during the course of experimental diabetes are presented. Table 1 shows that serum total cholesterol level in the control group amounted to 0.3904 mmol/l. After 21 days the increase by 19.1% was present and after 42 days another increase by 221.7% was noted comparing to the control group. On the 90th day of the study a decrease in serum total cholesterol level by 37% ensued comparing to Group 3. On the 180th day of the study total cholesterol level was the highest and amounted to 1.2930 mmol/l on average. Serum total cholesterol level in this group was higher by 231.2% comparing to the control group.

Table 1. Level of serum total cholesterol in rabbit during the course of experimental diabetes

	Group 1	Group 2	Group 3	Group 4	Group 5
Level of serum total cholesterol (mmol/l)	0.3904	0.8556	1.2559	0.7827	1.2930
SD	0.1120	0.3029	0.7776	0.4545	0.7913
Confidence interval	± 0.0662	± 0.1790	± 0.4595	± 0.2686	± 0.4676

Table 2 presents serum triglycerides levels in rabbit during the course of experimental diabetes. As it is presented in Table 2 average triglycerides level was 1.3954 mmol/l. During the study a significant increase in triglycerides level was observed until day 42 of the diabetes, on day 21 the increase was by 120.6%, and on day 42 it amounted to 188.1% comparing to the control. On day 90 of the diabetes a decrease in triglycerides level by 43% was noted comparing to group of the highest level of triglycerides. After 180 days of the course of diabetes the level of triglycerides was higher by 9.2% than in Group 4. Relative values of confidence intervals for average serum triglycerides levels in particular experimental groups amounted to: +/- 26.2%,+/- 22.7%, +/- 41%, +/- 12.6%,+/- 9.7%. Relative values of confidence intervals for mean serum total cholesterol levels in groups 3, 4 and 5 were similar and amounted to +/ - 35.3% on average. Confidence intervals in Groups 1 and 2 were +/- 16.9% and +/- 20.9 % respectively.

Table 2. Level of serum triglycerides in rabbit during the course of experimental diabetes

	Group 1	Group 2	Group 3	Group 4	Group 5
Level of serum triglycerides (mmol/l)	1.3954	3.0782	4.0209	2.2929	2.5039
SD	0.6188	1.1845	2.7881	0.4910	0.4141
Confidence interval	± 0.3657	± 0.7000	± 1.6477	± 0.2902	± 0.2447

Mean serum HDL level during the course of the study is presented in Table 3. No significant differences in HDL levels in Groups: 1, 3 and 5 were noted. Whereas Groups 2 and 4 presented with the increase of HDL level comparing to the control group respectively by 31.3% and 25%. Confidence intervals values in all the experimental groups were similar.

Table 3. Level of serum HDL in rabbit during the course of experimental diabetes

	Group 1	Group 2	Group 3	Group 4	Group 5
Level of serum HDL (mmol/l)	0.0332	0.0436	0.0345	0.0415	0.0348
SD	0.0209	0.0215	0.0180	0.0279	0.0253
Confidence interval	± 0.0124	± 0.0127	± 0.0107	± 0.0165	± 0.0150

Our studies revealed significant increase in cholesterol and triglycerides levels which is consistent with the results that were obtained by other authors (1, 2, 3, 4, 5). That mechanism might be responsible for faster development of atheromatosis during the course of diabetes mellitus (5).

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SUMMARY

The study was conducted on 56 rabbits, of White New Zealand breed, male gender. The average weight of the rabbits was 3 kg. The diabetes was evoked by intravenous injection of 10% alloxan, using the single dose of 100 mg/kg. On the 7th day after administration of alloxan, serum glucose levels were determined. The serum glucose level higher than 11.1 mmol/l was considered an indicator of the presence of diabetes. All the animals included in the study were divided into five groups: the control, 21-day diabetes, 42-day diabetes, 90-day diabetes and 180-day diabetes. Serum total cholesterol, triglycerides and high density lipoproteins levels were determined with enzymatic methods. Our studies revealed a significant increase in cholesterol and triglycerides levels. That mechanism might be responsible for faster development of atheromatosis during the course of diabetes mellitus

Poziom cholesterolu całkowitego, trójglicerydów oraz lipoprotein o wysokiej gęstości (HDL) w surowicy krwi u królika w przebiegu cukrzycy doświadczalnej

Badania przeprowadzono na 56 królikach rasy nowozelandzkiej białej, samcach dojrzałych płciowo o masie ciała około 3 kg. Cukrzycę wywoływano poprzez dożylną iniekcję 10% alloksanu w dawce 100 mg na kilogram masy ciała. W siedem dni po podaniu alloksanu określano poziom glukozy we krwi. Za kryterium cukrzycy przyjęto wartości powyżej 11,1 mmol/l. Materiał podzielono na grupy: kontrolną, z cukrzycą 21-dniową, 42-dniową, 90-dniową i 180-dniową. Poziom cholesterolu całkowitego, trójglicerydów oraz lipoprotein HDL oznaczano metodami enzymatycznymi. Przeprowadzone badania wykazały znaczny wzrost poziomu cholesterolu całkowitego i trójglicerydów. Może on odpowiadać za szybszy rozwój miażdżycy w przebiegu cukrzycy.