

Effect of Ramadan Fasting on the levels of IL-1 α , IL-2, IL-6 and IL-8 Cytok
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By

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Abstract

Ramadan fasting is one of the pillars of islam. It is often a subject of discussion whether or not Ramadan fasting confers any effect on immune cytokines. The aim of this study was to evaluate the effect of Ramadan fasting on the level of IL-1 α , IL-2 , IL-6 and IL-8. The study was performed on (30) normal healthy fasting and (30) normal healthy non-fasting individuals in the month of Ramadan (September 2009). Blood samples were obtained after the second week of the fasting and were analyzed for IL-1 α , IL-2 , IL-6 and IL-8 . There was a slight elevation in IL-1 α , IL-2 and IL-8 and a slight decreasing in IL-6 cytokine level but the differences didn't reach the degree of significance ($P > 0.05$). Slight elevation of IL-1 α , IL-2 , IL-8 and slight decreasing of IL-6 in normal healthy fasting in comparison to normal healthy non-fasting individuals were observed. Thus Ramadan is safe and causes Immunomodulation. Ramadan fasting, Immunomodulation, Interleukins.

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Ramadan fasting is one of Islamic pillars. The fasting time is about 12-19 hrs a day, depending on the season which Ramadan falls in and the geographical position of the country(1) .During Ramadan the majority of Muslims have two heavy meals, one immediately after sunset and the other just before dawn. They are allowed only to eat and drink during the period between sunset and dawn (2).Islamic fasting provides a unique model of fasting. It differs from regular, voluntary or experimental, fasting by that the fasting person does not eat or drink during the whole fasting hours.(3) The effect of fasting on the immune system and the relationship between the immune system and Metabolism are important scientific and practical problem a wide use of low-caloric diets.(4-6) Some experimental fasting data demonstrate the important role of cytokine during fasting which manifest by their influence on the endocrine system.(7,8) The aim of this study was to evaluate the effect of Ramadan fasting on some cytokines namely interleukin-1 α , interleukin-2 , interleukin-6 and interleukin-8 .

Materials & Methods:

Samples: The study included (60) samples which were taken from (30) normal healthy fasting and (30) normal healthy non-fasting subjects, aged between (21-58) (mean 34.5 \pm 11.5) years during Ramadan month 2009.

Serum samples were collected in two separated tubes and stored at -20°C which were thawed immediately before the estimation of IL-1 α , IL-2 , IL-6 and IL-8 using enzyme immunoassay method (Biomegrab).

The intensity of coloration produced was proportional to the IL-1 α , IL-2 , IL-6 and IL-8 concentration in the sample or the standard.

The absorbance of each well was read at 450nm against substrate blank and the results were calculated by interpolation from the standard curve which was constructed in the same assay as the samples, then the location of the average absorbance for each sample on the vertical axis was done and the corresponding cytokine concentration was read on the horizontal axis.

Statistical Analysis

t-test was used to compare the result according to (9).

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Results

Table (1) showed that the mean of interleukin-1 α level was 19592.80 in normal healthy fasting in comparison with 19581.89 of normal healthy non-fasting with no significant difference ($P > 0.05$).

Table (2) showed the mean of interleukin-2 level was 1833.4 in normal healthy fasting in comparison with 1819.4 of normal healthy non-fasting with no significant difference ($P > 0.05$).

Table (3) showed the mean of interleukin-6 . The level was 21425.5 in normal healthy fasting in comparison with 21467.4 of normal healthy non-fasting with no significant difference ($P > 0.05$).

Table (4) showed the level of interleukin-8 the mean was 22309.7 in normal healthy fasting in comparison with 22264.0 of normal healthy non-fasting with no significant difference ($P > 0.05$).

Table-1: IL-1 α levels (pg/mL) in sera of normal healthy fasting and non-fasting.

Groups	IL-1 α in serum (pg/mL)			
	No.	Mean \pm SD	High value	Low value
Healthy fasting	30	19592.81 \pm 2.67	19604.44	19535.50
Healthy non-fasting	30	19581.89 \pm 5.41	19657.70	19555.30

* $P > 0.05$

Table-2: IL-2 levels (pg/mL) in sera of normal healthy fasting and non-fasting.

Groups	IL-2 in serum (pg/mL)			
	No.	Mean \pm SD	High value	Low value
Healthy fasting	30	1833.80 \pm	1917.3	1825.0
Healthy non-fasting	30	1819.4 \pm	1820.30	1818.25

* $P > 0.05$

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Table-3: IL-6 levels (pg/mL) in sera of normal healthy fasting and non-fasting.

Groups	IL-6 in serum (pg/mL)			
	No.	Mean \pm SD	High value	Low value
Healthy fasting	30	21425.29 \pm 9.3	21451	21402.1
Healthy non-fasting	30	21467.40 \pm 6.40	23430.6	21002.5

* P > 0.05

Table-4: IL-8 levels (pg/mL) in sera of normal healthy fasting and non-fasting.

Groups	IL-8 in serum (pg/mL)			
	No.	Mean \pm SD	High value	Low value
Healthy fasting	30	22309.7 \pm 18.2	22384	21887.0
Healthy non-fasting	30	22264.0 \pm 18.9	22385	21382

* P > 0.05

Discussion

The result obtained from this study revealed a slight elevation in the mean value of IL-1 α in normal healthy fasting individual in comparison with normal healthy non-fasting one (Table-1) with no significant differences (P>0.05). One mechanism of initiating innate host defense under control of endocrine system is the production of cytokine by cells of the immune system, autonomic nervous system stimulating the secretion of IL-1 α (10, 11).

The mean value of IL-2 revealed a slight elevation in normal healthy fasting in comparison with normal healthy non fasting (Table-2) with no significant differences (P>0.05). This may be due to combined effect of catecholamines and glucocorticoid on the monocyte and macrophages to stimulate innate immunity and Th1 related cytokines such as IL-2 (11).

The mean value of IL-6 showed a slight decreasing in normal healthy fasting in comparison with non-fasting (Table-3) with no significant differences (P>0.05). This may be

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due to the effect of fasting (10) despite the inherent inflammatory activity. IL-6 play a major role in the overall control of inflammation by stimulating glucocorticoid secretion.(10,11)

Also, the results showed a slight elevation of IL-8 in normal healthy fasting in comparison with non-fasting (Table-4) with no significant differences. The explanation of slight elevation of the IL-8 may be due to increasing the level of lipopolysaccharide during fasting which increase synthesis of interferon- γ .(12-14) So, the interferon- γ stimulate the production of IL-8 and many other cytokines.

The safety of Ramadan fasting in healthy individuals was evaluated by blood analysis of IL-1 α , IL-2 , IL-6 and IL-8, the results denoted that moreover it is safe, Ramadan fasting causes favorable Immunomodulatory effects.

References

1. Scott, T.G. The effect of Muslim fast of Ramadan on routine laboratory investigation. King Abdulaziz Med. J. (1981). 1: 23-35.
2. Proceeding of the second international congress on Health and Ramadan 1-3 December. Istanbul, Turkey, (1997).
3. Qujeq, D.; Bijani, K.; Kalau, K., Mohiti, J. and Aliakbarpoar, H. Effects of Ramadan fasting on serum low-density and high density lipoprotein – cholesterol concentration. Annals of Saudi Medicine. (2002). 22: 297-299.
4. Nagra, S.A. and Gilani, A.H. A physiological and hematological study of Ramadan fasting in Pakistan. J. Sci. Res. Pu. (1991). 20: 25-30.
5. Shcherbakov, V.L and Pozdnyakov, I.M. Study of some Immunity parameters in patients Receiving Low-Caloric Diets. Bulletin of Experimental Biology and Medicine. (2004). 138: 565.
6. Al-Jewari, M.M. and Mohammed, K.I. Effect of Ramadan fasting on clinical Biochemical and Immunological parameters in Healthy fasting and type 2 diabetes mellitus patients. Iraqi Postgraduate Medical Journal . (2007). 6: 272-275.
7. Hiramoto, K.; Homma, T.; Jikumaru, M.; Miyashiata, H.; Sato, E. and Inoue, M. Fasting Differentially Modulates the Immunological System: Its Mechanism and Sex differences. J. Clinc. Biochem. Nutr. (2008). 43: 75-81.

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8. Azizi, F. and Siahkolah, B. Ramadan fasting and Diabetes mellitus. Arch. Iranian Med (2003). 6: 237-242.
9. Steel, R.G. and Torrie, J.H. Principle and Procedures of statistics; 2nd ed.; Mc-Graw Hill book company, Inc. New York , (1980).
10. Mastorakos, G.; Chrousos, G.P. and Weber, J.S. Recombinant interleukin-6 activates the hypothalamic – pituitary axis in humans. J. Clin. Endocrinol. Med. (1993). 77: 1690-1694.
11. Bateman, A.; Singh, A.; Kral, T. and Solomon, S. The immune hypothalamic – pituitary – adrenal axis. Endocr. Rev. (1989). 10: 92-112.
12. Elenkov, I.J. and Chrousos, G.P. : Stress hormone Th1 , Th2 patterns prol anti-inflammatory cytokines and susceptibility to disease. Trends. Endocrinol. Metab. (1999). 10: 359-368.
13. Park, S.R.; Kim, H.A.; Chan, S.K.; Park, J.B. and Kim, P.H. Mechanisms underlying the effect of Lps and activation induced cytidine deaminase on IgA isotype expression. Mol. Cells. (2005). 19: 445-451.
14. Yamamoto, M., Kewon, M.N., Rennert, P.D., Hirori, T.; Fujihashi, K. McGhee, J.R and Kiyono, H. Role of gut associated lymphoreticular tissues in antigen-specific intestinal IgA immunity . J. Immunol. (2004). 173: 762-769.