



THE SEASONAL FLUCTUATIONS OF INFECTION AND SPERM ACTIVITY IN THE TEMPERATE CLIMATE

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Abstract

Widal and Rose Bengal tests were conducted for patients who were attending to the High Institute of Infertility Diagnosis and Assisted Reproductive Technology/Al-Nahrain University and a private Laboratory during the years 2005-2007. Monthly variation in the incidence of infections and the number of motile sperms were studied. For Widal test a titer of 1:80 regarded as negative, and a titer of 1:160 and more considered positive for O and H antigens with visible agglutination. Brucello-slide test was used to detect brucella-specific agglutinins. The positive sera for each of Brucella and Salmonella were 140 and 1505, during the years 2006, 2007 and 2005, 2006, 2007 respectively. The seminal fluid analyses were evaluated separately for other 4398 patients during the years 2006-2007 to detect the number of motile sperms. The study revealed a significant difference between winter and summer, higher in summer than winter with respect to Brucellosis [$p < 0.05$], Salmonellosis [$p < 0.0001$]. In contrast, the number of motile sperms was higher in winter than summer [$p < 0.01$]. On the other hand, the study may refer to the presence of a similar regular rhythm of the infections that take place and the vitality of spermatozoa during different months of the year.

Keywords: Sperm activity, Temperate climate, Infection.

التقلب الموسمي للعدوى ونشاط الحيمن المنوي في المناطق المعتدلة

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الخلاصة

تم اجراء اختبار الويدال والروز بنغال للمرضى المراجعين للمعهد العالي لتشخيص العقم والتقنيات المساعدة للانجاب/جامعة النهرين والمختبر الخاص خلال الاعوام من ٢٠٠٥-٢٠٠٧، درس التغير الشهري في حدوث المرض وفي عدد الحيامن المتحركه. إختبار الويدال انجز والتخفيف ١:٨٠ إعتبر سلبى، والتخفيف ١:١٦٠ وأكثر إعتبر إيجابى للمُسْتَضَدات H, O المصحوبه بتلزن مرئى. إختبار الشريحة للبروسيللا استعمل للكشف عن المستضد النوعى للبروسيللا كان مجموع المصل الإيجابى للبروسيللا و لسالمونيللا ١٤٠ و ١٥٠٥ خلال السنوات ٢٠٠٦, ٢٠٠٧ و ٢٠٠٥, ٢٠٠٦, ٢٠٠٧ على التوالي. تم فحص السائل المنوى بشكل منفصل ل٤٣٩٨ مريضا خلال السنوات ٢٠٠٦-٢٠٠٧ للكشف عن عدد الحيامن المتحركه اظهرت الدراسه فرق معنوى بين الشتاء والصيف، وكان اعلى فى الصيف منه فى الشتاء بالنسبه لحمى مالطا [$p < 0.05$], و للتيفويد [$p < 0.0001$].

ولكن بالمقابل كان عدد الحيامن المتحركه فى الشتاء اعلى من الصيف [p<0.01] . من جانب اخر قد تشير الدراسة إلى التشابه في طبيعته الدوريه للأمراض المعدية وحيوية الحيوانات المنوية خلال أشهر السنة.

INTRODUCTION

Salmonellosis in human is usually due to consumption of contaminated food and / or water [1].

Typhoid fever is a distinctive acute system febrile infection of the mononuclear phagocytes usually caused by Salmonella typhi , S.paratyphi A and B, and occasionally S.typhimurium .

The Widal test, which detects agglutinating antibodies to lipopolysaccharide [LPS] of typhi [] and typhi H was introduced over a century ago and is widely used for the serological diagnosis of typhoid fever[2,3].

Brucellosis is an important, but often neglected cause of morbidity in many regions of the world [4,5].The disease is transmitted from infected animals by direct contact with blood, fetuses and fetal membranes, uterine secretions and aborted material or through consumption of infected raw animal products such as milk and milk products [6].

In endemic regions cholera outbreaks are often associated with climatic events [7, 8].

Most scientists believe that the sperm motility is sensitive indicator in evaluation of seminal fluid competence in ovum fertilization [9]. Some authors found seasonal fluctuations of the seminal fluid parameters which are in a best condition during spring, winter, autumn and very weak during June and at the end of summer [10, 11].

There were no significant month to month variations in the mean semen volume and density over the 5 year period in a study conducted in subjects staying in the tropics that may be related to relative constant temperature [12].

No significant seasonal variation in motility of spermatozoa motility was found in men living either north or south of Arctic Circle [13]

MATERIALS AND METHOD

The serological diagnosis was performed and the samples were collected during the period 2005-2007 from men who were suspected to be infected by typhoid or brucellosis.

Widal test was performed and a titer of 1:80 was regarded as negative, and a titer of 1:160 and more regarded as positive for O and H antigens with visible agglutination. Brucello-slide test was used to detect brucella-specific agglutinins, reagents and sera were allowed to reach room temperature, 0.03ml of the serum sample and

one drop of antigen [previously shaken] were put on a slide, mixed and the slide was shaken slowly for exactly four minutes, The same procedure was done for positive control.

Separately 4398 patients during the years 2006-2007 underwent seminal fluid analysis and for motility assessment, a 10 microliter of ejaculate was placed on a slide, the movements of spermatozoa of many fields were scored as rapid motility (A),slow or sluggish or progressive motility (B),non- progressive motility (C)and immotile (D).

Data were processed using student's t-Test [14].

RESULTS AND DISCUSSION

(Table-1) show the distribution of infection for Brucella and Salmonella through the months of the years 2006, 2007 and 2005, 2006, 2007 respectively.

From the total positive serum 140, 1505 for Brucilosis and Salmoiinllosis respectively the highest incidence was in June.

The same table indicate also the distribution of mean number of motile sperms for 4398 patients during the months of the years 2006 and 2007.

The lipopolysaccharide are derived from the cell walls of Gram negative bacteria such as salmonella and brucella and are often liberated when the bacteria leys , and it has been demonstrated that testicular macrophages release tumor necrosis factor (TNF) when exposed to LPS [15,16].

A significant [p<0.05], p<0.0001]] increase was obtained in summer compared to winter months with respect to Brucilosis and Salmonillosis respectively (Table-2).

The maximum number of motile sperm observed at the first quarter of the year and the lowest at May, June, and July. These results was similar to that reported in previous studies [10, 11].

This study reveals a significant (p<0.01) decrease in summer compared with winter in the mean number of motile sperms (Table-2).the length of the daylight period may have a slight impact on hormonal markers of spermatogenesis but does not cause substantial changes in numbers and motility of spermatozoa [13].Sperm bacterial contamination is quite frequent and could contribute to the deterioration of the sperm quality of infertile men [17].

The association of organ dysfunction with infection has long been evident, and the close relationship between organ dysfunction and mortality during the evolution of sepsis was confirmed [18].

So, the seasonal fluctuation of the number of motile sperms may be periodically affected with the incidence of infections such as Salmonella and Brucella.

The changes in the number of motile sperms may be affected by the continuous changes of the power of bacterial toxin, which

endogenously or exogenously reached the different body organs, participating with other factors such as tumor necrosis factor alpha, interleukin-1, interleukin 6, thromboxaneA2, to cause dysfunction for these organs.

This study may help the worker in the field of the assisted reproductive technology to select the suitable months of the year to perform the fertilization processes for patients.

It may also help the centers of health services and epidemiology in preparing their needs of antibiotic and drugs early.

(Table-1) The seasonal variation of Brucellosis, Salmonellosis, the number of motile spermatozoa and the standard error of sample mean [Mean \pm SE] in all patients

Month	Frequency of brucella infections		Frequency of salmonella infections			Mean \pm SE of salmonella and brucella infections		monthly average of the number of motile sperms		Mean \pm SE of Motile sperms
	2006	07	2005	06	07	Brucella	Salmonella	2006	2007	2006+07
Jan	2	1	22	1	13	1.5 \pm 0.49	12.3 \pm 6.07	25	26	25.5 \pm 0.49
Feb	7	1	13	13	12	4 \pm 3.12	12.6 \pm 0.32	25	26	25.5 \pm 0.49
Mar	12	1	43	19	20	6.5 \pm 2.49	27.3 \pm 7.83	27	28	27.5 \pm 0.49
Apr	7	2	15	35	27	4.5 \pm 2.49	25.6 \pm 5.80	24	23	23.5 \pm 0.49
May	10	8	12	99	58	9 \pm 0.99	56.3 \pm 43.52	18	21	19.5 \pm 1.49
Jun	19	17	98	22	113	18 \pm 0.99	77.6 \pm 28.16	24	19	21.5 \pm 2.49
Jul	10	6	68	11	105	8 \pm 1.99	61.3 \pm 27.33	19	23	21 \pm 1.99
Aug	6	9	78	7	110	7.5 \pm 1.49	65 \pm 30.43	13	27	20 \pm 6.99
Sep	7	4	70	24	100	5.5 \pm 1.49	66.6 \pm 22.06	21	22	21.5 \pm 0.49
Oct	3	3	63	23	54	3 \pm 0	46.6 \pm 12.11	23	26	24.5 \pm 1.49
Nov	4	1	43	9	35	2.5 \pm 1.49	29 \pm 10.25	24	25	24.5 \pm 0.49
Dec	2	-	35	21	15	1 \pm 1.41	23.6 \pm 5.92	24	26	25 \pm 0.99

(Table-2) The difference between winter and summer in the rate of Brucella, Salmonella Infections, the mean number of motile Spermatozoa and the standard error of sample mean [Mean \pm SE] in all patients

Variables Month	Mean \pm SE of Brucella infections	Mean \pm SE of Salmonella infections	Mean \pm SE of Motile sperms
Nov*	2.5 \pm 1.49	29 \pm 10.25	24.5 \pm 0.49
Dec*	1 \pm 1.41	23.6 \pm 5.92	25 \pm 0.99
Jan*	1.5 \pm 0.49	12.3 \pm 6.07	2006+07
Feb*	4 \pm 3.12	12.6 \pm 0.32	25.5 \pm 0.49
Mar*	6.5 \pm 2.49	27.3 \pm 7.83	25.5 \pm 0.49
Apr*	4.5 \pm 2.49	25.6 \pm 5.80	27.5 \pm 0.49
May \square	9 \pm 0.99	56.3 \pm 43.52	19.5 \pm 1.49
Jun \square	18 \pm 0.99	77.6 \pm 28.16	21.5 \pm 2.49
Jul \square	8 \pm 1.99	61.3 \pm 27.33	21 \pm 1.99
Aug \square	7.5 \pm 1.49	65 \pm 30.43	20 \pm 6.99
Sep \square	5.5 \pm 1.49	66.6 \pm 22.06	21.5 \pm 0.49
Oct \square	3 \pm 0	46.6 \pm 12.11	24.5 \pm 1.49
Significance	P < 0.05	P < 0.0001	P < 0.01

*Winter \square Summer

Reference:

- [1]Thong K.L, Y.L Goh, S.Radu, S.Noorza leha, R.Yasin, Y.T.Koh, V.K.E.Lim, G.R uul, and S.D.2002.Puthuchery Genetic Diversity of Clinical and Environmental strains of Salmonella enterica Serotype weltevreden isolated in Malaysia. *J.Clin.Microbiol.*40:2498-2503.
- [2]Schroeder, S.A.1968 Interpretation of Serologic tests for typhoid fever. *JAMA* 206:839-840.
- [3]Araj, G.F, and R. A. Azzam.1996.Seroprevalence of Brucella antibodies among persons in high-risk occupation in Lebanon. *Epidemiol.infect.*117:281-288
- [4]Al-Eissa, Y., F. Al-Zamil, M. Al-Mugeiren, S. Al-Rasheed, Al. Al-Sanie, and A. Al-Mazyad.1991.Childhood brucellosis: a deceptive infectious disease. *Scand. J.infect.Dis.*23:129-133.
- [5]Idris, M.A., M. Maiwald, K.N. El-Maully, and A. Ruppel.1993.Human brucellosis in Dhofar, Sultanate of Oman. *j.Trop.Med.Hyg.*96:46-50.
- [6]Young, E.J.1994. An overview of human brucellosis. *Clin.infect.Dis.*21:283-290.
- [7]Motes, M, A. Depaola, S.Zywno-Van Ginkel, and M. Mc.Phearson.1991.occurrence of toxigenic vibrio cholera 01 in oysters in Mobile Bay, Alabama:an ecological investigation. *J.Food Prot.*57:975-980.
- [8]Lobitz B, Beck L, Huq B, wood B, Fuchs G, Faruque. SM, et al:Climate and infectious diseases: use of remote Sensing for detection of vibrio cholera by indirect measurement. *Proceedings of the national Academic Society USA* 2000, 97:1438-1443.
- [9]Giblin PT, Poland ML, Moghissi Ks, et al.1988.Effects of stress and characteristic adaptability on semen quality in healthy men. *Fertilsteril.*49:127.
- [10]Paulsen CA [ed.].Laboratory manual for the examination of Human Semen and Semen Cervical Mucus interaction .Singapore: Press Concern [WHO], 1980
- [11]Saint Pol. P, Beuscart .R, Leroy-Martin B.1989. Circannual rhythms of Sperm parameters of fertile men. *Fertil.Steril* 51:1030.
- [12]Sin-Eng Chia, Soon-Tiong Alvin Lim, Lee-Mee Ho and Sun-Kuie Tay.2001.Monthly variation in human semen quality in male partners of infertile women in the tropics. *Human reproduction.* 16:277-281.
- [13]Gunilla Malm, Trine B.Haugen, Trine Henriksen, Cathrine Bjorsvik, et al.2004 Reproductive Function during summer and winter in Norwegian Men Living North and South of the Arctic Circle, *J.Clin. Endocrinol* 89 [9]:4397-4402
- [14]P.S.S.sundarj.Richard.1996Third edition, new delhi, p31-82.
- [15]Moor, C. and Huston, J.C.1994. physiological relevance of tumor necrosis factor in mediating macrophage-Leydig Cell interaction. *Endocrinology:*134:63-69.
- [16]Ricciol.A, Starace. D, D'Alessio, et al .2000 TNF-alpha and IFN-gamma regulate expression and function of the Fas System in the seminiferous epithelium. *J.Immunol.*,165:743-749.
- [17]Moretti, Capitani, Figura and Pammolli A.2009 The presence of bacteria species in semen and Sperm quality. *J Assist reprod Genet.*26:47-56.
- [18]Rangel -Frausto, Pittet, Costigan, et al.1995.The natural history of the systemic inflammatory response syndrome[SIRS].A prospective study. *JAMA*273[2]:117-123.