

Effect of Aspirin on Sperm Specification and Some Hematological Parameters in Male Albino White Rat

تأثير الأسبرين على مواصفات النطف وبعض قياسات الدم في ذكور الجرذان البيضاء

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Abstract

Thirty male albino rats were divided into three groups, the first group was given aspirin at a dose of 25 mg / kg orally and twice a day, the second group dosage was 125 mg / kg at the same way, the third set group which considered as control was treated with physiological saline, each group took 0.5 ml amount. The period of experience took four weeks at the end of the experience, in the day 29th the animals were anesthetized and eradicated the epididymis and calculated the total number of sperm and percentages of viable and dead sperm as well as the percentages of motile and non-motile sperm, the blood was taken for hematological tests, results confirmed the existence of a decreased significant value ($P < 0.01$) in the total number of sperm of the 2nd group compared with control group and the decline value was less significant ($p < 0.05$) in the first group compared with control group. In addition a significant value ($P < 0.01$) increased in the percentage of dead sperm and non-motile sperm, also a significant value ($p < 0.01$) decreased in the percentage of viable sperm and motile sperm, while the results proved the existence of a significant value ($p < 0.05$) reductions in PCV, Hb, TWBC and monocyte values compared with control group. effect of aspirin on the male reproductive system may be due to being a Prostaglandins inhibitor, and These findings probably indicate that aspirin have deleterious effect on the blood chemistry of male albino rats.

Key words: Aspirin, Sperms, Hematological Parameters

المخلص

قسمت ثلاثين من ذكور الجرذان البيض البالغة الى ثلاثة مجاميع، أعطيت المجموعة الأولى الأسبرين بجرعة 25 ملغم/ كغم عن طريق الفم ولمرتين يوميا أما المجموعة الثانية فتم تجريعها بجرعة 125 ملغم / كغم بنفس الطريقة في حين اعتبرت المجموعة الثالثة مجموعة سيطرة وتم تجريعها بالمحلول الفسلجي، كان حجم المحلول المجرع هو 0.5 مل لكل مجموعة. استمرت فترة التجربه على مدى أربعة أسابيع وفي نهاية التجربه ، في اليوم 29 خذرت الحيوانات واستأصل البربخ وحسب العدد الكلي للنطف والنسب المنوية للنطف الحيه والميته أضافه الى النسب المنويه للنطف المتحركه وغير المتحركه ، وسحب الدم لإجراء الفحوصات الهيماتولوجية. أثبتت النتائج وجود انخفاض معنوي ($P < 0.01$) في العدد الكلي للنطف في المجموعة الثانية مقارنة مع مجموعة السيطره وكان هذا الانخفاض أقل معنويا في المجموعة الأولى مقارنة مع مجموعة السيطره ($p < 0.05$) أضافه الى حصول ارتفاع معنوي ($P < 0.01$) في نسب النطف الميته وغير المتحركه وانخفاض معنوي في نسب النطف الحيه والمتحركه ، كما واثبتت النتائج وجود انخفاض معنوي ($P < 0.05$) في مستوى خلايا الدم الحمراء، وخضاب الدم و كريات الدم البيضاء الكلي و احادية النواة مقارنة بمجموعة السيطرة. ربما يعود تأثير الاسبرين على الجهاز التناسلي الذكري الى كونه مثبط للبروستوكلاندين ويستدل من هذا البحث على ان الأسبرين له تأثير على كيميائية الدم.

الكلمات المفتاحية: الأسبرين، النطف، قياسات الدم

Introduction

Aspirin is an incredible chemical with many useful benefits in the medical field, it is a true herb, originally coming from the bark of the white willow tree [1]. One of the areas of aspirin effect on physiology of human and animals that has not been widely experimented on, is the area of its effect on the reproductive system male and female [2]. Aspirin or Acetylsalicylic acid (ASA) has remained one of the world's safest, least expensive and most consumed analgesics. Aspirin, along with its analgesic-antipyretic uses, is now also being considered for prevention of cardiovascular disease, cancer, and treatment of human immuno-deficiency virus infection. Aspirin, one of the first drugs to come into common usage, is still mostly the widely used in the world - approximately 35,000 metric tones are produced and consumed annually [3]. Aspirin has been reported to be used in preventing heart attack and strokes [4], colorectal cancer [5] as well as myocardial infarction [6].

Low-dose ASA irreversibly inhibits the enzyme cyclo-oxygenase in platelets, preventing the synthesis of thromboxane [7,8,9], which is a potent vasoconstrictive agent. Aspirin administration for 30 days (5

mg/100 g body weight) caused a significant decrease in the weight of testis of immature rats. Decrease in the activities of sorbitol dehydrogenase and hyaluronidase was observed in both immature and mature rats. Decrease in the number of spermatids and increase in size of spermatocytes nuclei were observed. It is concluded that aspirin causes impairment of the later stages of spermatogenesis [10]. Numerous clinical observations have associated the use of aspirin with blood disorders like anemia and cytopenias. While the relative risk of occurrence of blood disorders with the use of aspirin is considered to be low, significant mortality rates have been reported due to blood disorders caused by the use of aspirin [11]. Although blood disorders with the use of aspirin have been well documented clinically, relatively few experimental studies have been conducted to clarify and confirm the association. It has been shown that oral administration of low doses of aspirin significantly reduces circulatory erythrocyte and leukocyte counts suggesting the inhibitory action of this drug on bone marrow hemopoiesis [12]. However, in that study only peripheral blood was investigated and no attempt was made to study the bone marrow, a speculated target site of aspirin action causing blood toxicity [13].

Materials and Methods

This study used albino rats 12-14 weeks old, Animals were obtained from the colony of the animal house of the Institute of Embryo Research and Infertility Treatment, Al-Nahrain University. The aspirin used in this study was in the form of Aspegic a daily dose per animal which taken orally by stomach tube that divided into two equal doses per day. Duration between these two doses was 6 hours. Thirty male rats were divided into three groups. First group which called group A treated with a dose of 25 mg / kg of B.W., and the 2nd group which is called group B treated with a dose of 125 mg/ kg of B.W. while the third group was considered control and treated with physiological saline. The experiment lasted for 4 weeks, in the end of the experiment animals were anesthetized, removal of the epididymis, and then methods were done to measure the following:

Total count of sperm

The head of the epididymis were separated and cutted into small pieces, 0.8 ml of formalin saline added with 0.2 ml of eosin, the number of sperm was calculated by Hemocytometer [14].

The percentage of viable and dead sperm

One gram was separated from the tail of the epididymis in 1 ml physiological solution and cutted into small pieces. Drop of the solution took and added to a drop of eosin-nigrosin stain, the mixture deployed on a glass slide [15].

The percentage of motile and non-motile sperm

The tail of the epididymis was cutted into small pieces and added to 1 ml of the physiological solution. Drop of the mixture took and placed on a slide and calculated the percentage of motiled and non motile sperm [15].

Collection of Blood Samples

Blood samples were collected through the medial cantus into EDTA bottles for hematological, and plasm studies. The red blood cells (RBC) and white blood cells (WBC) counts were determined by the improved Neubauerhaemocytometer method. The hemoglobin (Hb) concentration was determined according to Jain method [16], using the cyanomethaemoglobin method. The packed cell volume (PCV) was determined by the microhaematocrit method [17]. Schilling method of differential leucocyte count was used to determine the distribution of the various white blood cells [18]. Mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH) and mean corpuscular haemoglobin concentration (MCHC) were computed according to Jain method [16].

Statistical Analysis

The mean and standard error of mean (S.E.M.) were calculated for all values. Comparisons between the control and the treated groups were done using Complete Randomized Design CRD [19]. Differences were considered statistically significant at ($p < 0.05$).

Results

As Shown in Table (1) the emergence of highly significant value ($P < 0.01$) decreased in the total number of sperm in the 2nd group compared with the control group, while the decreased was less ($P < 0.05$) significant value in the first group. The results for highly significant value ($P < 0.01$) decreased

in the percentage of viable and motile sperm accompanied by a highly ($P < 0.01$) significant value increased in the percentages of dead and non-motile sperm in the 2nd group compared with the control group. While the decreased was less ($P < 0.05$) significant in the first group compared with the control group. While the decreased in the viable and motile sperm was less ($P < 0.05$) significant in the first group compared with the control group.

Table (1):The effect of aspirin in the total number of sperm and the percentage of sperm motile and non-motiled and viable and dead sperm in male albino rats

Group	The total number of sperm(10^3)	Motile sperm%	Non-motile sperm %	Dead sperm %	Viable sperm%
Control group(physiologic-al saline)	141±1.4	83±2	23±1.8	15±2	89 ± 3
Group 1 (treated with 25 mg/kg B.W.)	133± 1.28*	75±2*	29±2.2*	19±1*	84± 2*
Group 2 (treated with 125 mg/kg B.W.)	131±0.9**	70±2.2**	37±1.9**	28±3**	77 ±2**

*means a significant($P < 0.05$) difference Compared with the control group.

** means a significant($P < 0.01$) difference Compared with the control group.

Values Representing the numbers in the table: averages ± standard error.

The effect of 25,125 mg/kg BW of aspirin on hematological parameters of albino rats after treatment of rats for 30 days are shown in Table 2. Treatment of rats with 125 mg/kg BW of aspirin caused significant ($p < 0.05$) reductions in PCV, Hb, TWBC and monocyte values relative to their respective controls; but caused insignificant ($p > 0.05$) changes in RBC, platelet, lymphocyte, neutrophil, eosinophil and the hematometric indices (MCV, MCHC, MCH) values in group 1 and 2 relative to their respective controls.

Table (2):Effect of (25,125 mg/kg BW) of Aspirin on the Hematological parameters of male albino rats

Parameters	Control	25 mg/kg Aspirin	125 mg/kg Aspirin
PCV%	49.8 ± 1.78	49.1± 1.1	41.9± 0.99*
HB (g/dl)	15.0± 0.66	14.98± 0.55	12.99± 0.36*
RBC (μL)	6.65± 0.71	6.55± 0.55	7.91± 0.35
MCV (f/l)	57.30± 1.46	57.29±1.1	55.90± 1.22
MCHC (g/dl)	19.44±1.65	19.38±1.63	18.0±1.41
MCH (pg)	34.22±1.01	34.1±1.1	32.1± 1.1
TWBC (x103 μL)	9.5± 6.99	8.5±2.3	4.6± 1.35*
Platelet (x105/μL)	1.04± 0.11	1.04±0.14	1.14±.96
Lymphocyte (%)	65.0± 5.4	65.1±5.4	66.7± 2.2
Neutrophil (%)	32.1±4.45	32.2±4.3	33.0±2.9
Monocyte (%)	2.4±41	2.2±33	1.1±31*
Eosinophil (%)	29.1±5.0	29.4±5.1	30.4±2.21

*means a significant($P < 0.05$) difference Compared with the control group.

Discussion

The effects of aspirin in the total number, motility, and effectiveness of the sperm are the most important factors affecting fertility, Increase the number of dead sperm to half of the total leads to complete infertility [20], Ghasemi [21] explained that giving aspirin to adult mice cause a decrease in the activity of certain enzymes such as Hyaluronidase, which is secreted by sperm and contributes to the process of ovarian Penetrate rubble during the process of fertilization. The effect of aspirin can be through the impact on the flow of calcium into sperm which is necessary for the formation, activation, and movement of sperm [22].

Perhaps the effect of aspirin in decrease testosterone hormone which result from the decrease LH hormone concentration, a significant effect in decrease the effectiveness of sperm, as that testosterone hormone increases the secretions of the epididymis and seminiferous tubules which has an important role in transmission of sperm[23]. Testosterone plays an important role in increasing the Fertilization portability of sperm *in vivo* and *in vitro*[24]. Perhaps due the effects of aspirin on the efficiency of the male reproductive system to work as a disincentive mechanism to configure Prostaglandins in members attached to the gonads, from the other hands its effect on the secretion of the gonads feeders and then secretion testosterone hormone as the same mechanism[25].

The significant reductions in PCV and Hb values caused by aspirin could indicate induction of anemia and decrease in oxygen- carrying capacity of the blood as well as the amount of oxygen delivered to the tissues respectively. Low dose aspirin is used increasingly in primary and secondary prevention of a number of medical conditions, many of which are common in older people, as is anemia, It is not clear whether there is an association between LDA and anemia in the absence of overt bleeding, but there may be an association between LDA and fall in Hb in (a subset of) older patients [26], this will indicate our high dose had the same act. The significant reduction in TWBC count caused by aspirin suggests that the immune system has been compromised. Contrary report in *Pelargonium reniforme* extract treated rats, the significant reduction in monocyte count probably indicates that the phagocytic function of the body has been compromised by aspirin[27].

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