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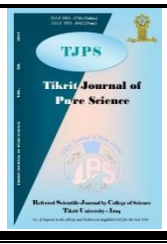

Study the effect of Metronidazole Drug (MTZ) and *Rhuscoriaria* (Sumac) on Testicular Tissues and sperms of Male White Mice

Saad T. Rasheed , Ismael I. Hasan , Mustafa T. Khalaf

College of veterinary medicine, University of Tikrit, Tikrit, Iraq

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Corresponding Author:

Name: Saad T. Rasheed
E-mail:
drsaadrasheed@tu.edu.iq

Tel:

Affiliation:

Abstract

In this study, thirty adult Swiss male mice weighing with an average weight of twenty seven gram were used. The animals were housed in animal house of the college of Veterinary Medicine/ Tikrit University under normal conditions. The whole animals were divided into three groups each of ten mice, and subdivided into two periods (fourteen and twenty eight days), first group considered as control which were administered with distilled water only. The second group was treated with the metronidazole (MTZ) at a dose of 0.37 mg / mouse /day, the third group were administered with the sumac solution of 0.04 ml / mouse / day. All groups were administered orally.

Histological technique was performed to study the effect of MTZ and sumac on the tissues of testis in addition of sperm qualification. The study showed that, the second group of (the two periods) represented the absence of the spermatogonia with the presence of leydig cells in the interstitial tissue. The third group demonstrated a histopathological effect on the testicular tissue such as seminiferous tubules. The study of the effect of MTZ and sumac on the proportion of male sperm showed abnormalities, and the effect of the MTZ showed significant ($P \leq 0.01$) abnormalities in the confirmation sperms compared with the control group and sumac.

Introduction

Males infertility is an important subject in human society, it include about 50% in couples [1] various drugs used for therapeutic purposes but have side effects causing infertility [2,3] Metronidazole and others drugs of the same family have an adverse effect on sperms and its testicular tissue [4-6], Metronidazol is a first drug of choice for many bacterial and parasitic infections in a period of 5 weeks of treatment although its long side effect was studied in rodents [4,7,8], many types of anti-oxidants help in detoxification of oxidation process that reduce infertility [9] using of medical plants have advantage in its low toxic effect and so plants widely utilized in organs disorders [10] Sumac consider one of these fruit plants grow in several middle east countries [11], polyphenols of Sumac reviewed to be an important source of antioxidant properties [12].

Materials and methods

Thirty adult Swiss male mice weighing about (26-28 g) with an average of 27 gram were used. The animals were purchased from Samara drug factory and housed in animal house of the college of Veterinary Medicine/ Tikrit University under normal conditions, divided into three groups each group of ten mice were subdivided for two periods (fourteen and twenty eight days), first group considered as control which were administered with distilled water only.The therapeutic dose of Metronidazole for adults was considered equal to 1000mg/day/individual. On this basis, the therapeutic dose was 0.37mg/ mouse/ day (weights average of mice were 27 g) [13].

The 50 g of sumac seed powder (supplied from the local markets of Salah-addin governorate) dissolved in 500 ml of sterilized distilled water and left for 24 hours [14], the solution was filtered by several layers of sterile soft cloth and then the final solution was stored at room temperature until use. The therapeutic dose of the sumac solution was (0.04 ml) of 10% w/v. [15]. The Sumac solution was administrated to the mice orally. At the end of experiment the tissue of organ preserved in 70% ethanol and histological section using H & E stains was prepared [16],

evaluation of semen was directly after killing of mice [17].

Result and discussion

Histological study:

Control group results of histological transverse section of testis showed well-organized normal histological constitution with well-organized seminiferous convoluted tubules preserved normal spermatogenesis Figure [1],

The group treated with MTZ drug for the period (14 day) showed low number of sperms with in the section were with wide ranges of different stages of development it shaped irregularly with loosing of many spermatids at thicken basal membrane, a debris of fragmented sperms appeared at the center of each tubule with limited atrophy in the Leydig cells (figure 2), The period (28 day) of MTZ treatment showed a histological effect of evacuation of seminiferous convoluted tubules from sperms and appearance of Leydig cells at interstitial tissue between the seminiferous convoluted tubules at limited numbers compressed with each other (figure 3), these results agree with other studies [18] specially at the changes in tubules and morphology of sperms [19] thickening of basal membrane others revealed it caused by cell injury through MTZ and other chemical passing blood testis barrier [20], It is evidenced that many of Metronidazole group including MTZ make cell necrosis and cell death via breaking of DNA strands [21]. Direct and indirect oxidative stress caused by MTZ also reported to causing cell damage [22].

With comparing of Sumac group (figure 4,5) to control group Figure (1) and MTZ group figure (2,3) the 14-day group of sumac treatment, Figure (4) showed a well-shaped testicular tubules surrounded by basal membrane for each tubule containing huge number of spermatids with primary and secondary cells with Pioneers sperms near the center of each tubule with wave's appearance of sperms toward the center of testicular tubule, blood capillaries also appeared around new Leydig cells. The 28-day group included a normal tissue of testis containing spiral seminiferous convoluted tubules with different stages of spermatogenesis and spermatogonia on the basal membrane, including remarkable of primary and secondary sperm cells with large number of spermatids and new Leydig cells Figure (5). The therapeutic effect of Sumac suggested to its working as antioxidant that revers the effect of oxidant stress caused by MTZ and other stress factors [23], and Flavonoids remarked one of these antioxidants [24], other researchers showed that Sumac affect therapeutically on tissue and even on sperm count and viability which is agree with the present study [25], Regulation of abnormal hormonal level in the body specially that is connected with gonadal function by sumac also discussed to be an important factor for posting testicular tissue structure and function of its organelles [26].

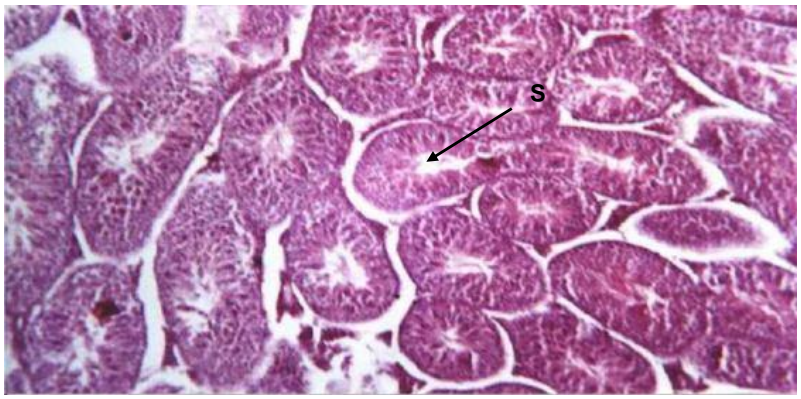

Figure (1) Transverse section of testis of control group showing normal appearance of seminiferous convoluted tubules (S) with different stages of spermatogenesis (H and E X10).

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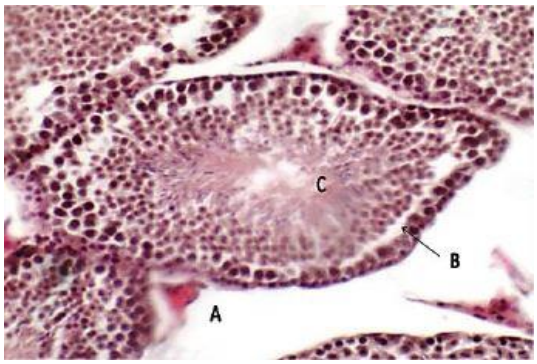

Figure (2) Transverse section of testis for (14 day) MTZ group; A) atrophy of Leydig cells, B) losing of many spermatogonia with thicken basal membrane of seminiferous convoluted tubule, C) Large masses of sperm cells and spermatids at the center of seminiferous convoluted tubule. (H and E 20x)

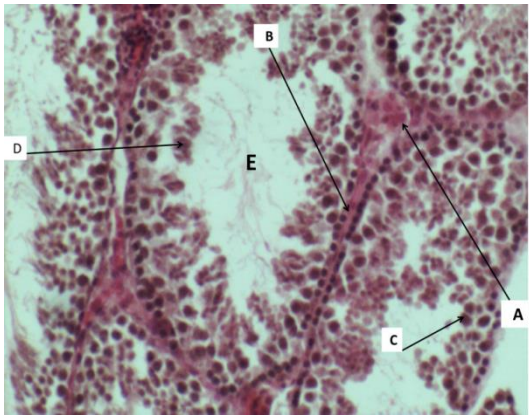

Figure (3) Transverse section of testis for (28 day) MTZ group; Seminiferous convoluted tubules and spermatids at the thicken basal membrane with compressed Leydig cells A) Atrophy of leydig cells in between seminiferous convoluted tubules, B) Thicken basal membrane, C) Primary and secondary spermatocytes, D) Masses of spermatids, E) Poor amounts of sperms.(H and E 20X)

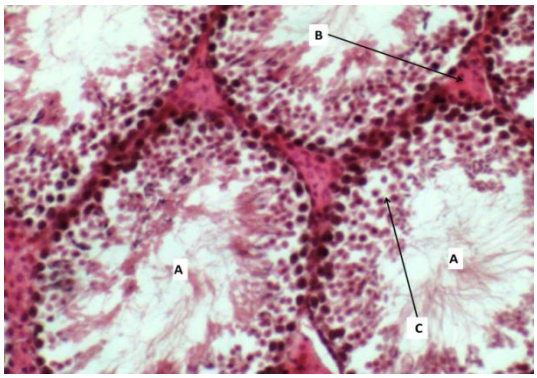

Figure (4) Transverse section of testis for (14 day) group of Sumac treatment: A) sperms, B) Leydig cells, C) Spermatids.(H and E 20X)

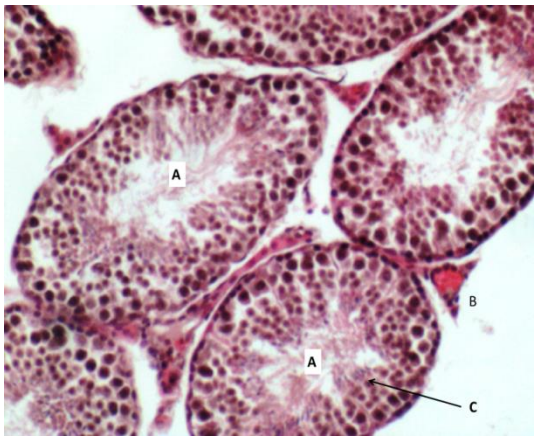

Figure (5) Transverse section of testis for (28 day) Sumac treatment: A) sperms, B) Leydig cells, C) Spermatids.(H and E 20X)

Sperm evaluation study:

Control group had the lowest sperm abnormalities when it compared to the other groups (table 1), and it had normal morphological and numeral characters of sperms (figure 1).

The sperm abnormalities of MTZ treatment group for both periods were significant ($P \leq 0.01$) when it compared with both control and Sumac group (table 1). semen evaluation results (figure2,3), (table1) of MTZ for both [14] and [28] day of treatment showed deformities in the sperms included loss of head, head hock, rounded head and loss of tail more that seen in both control and Sumac group. This revers to many causes suppressive effect of MTZ on pituitary gland and normal hormonal function is one of theme [19], the suppressive effect of Alpha glycosidase malondialdehyde and Transferase energy with low protein level at epididymis remake another reason, others showed that MTZ effect directly on leydig cells which is important in secretion of testosterone that is essential in the maturation process of sperms [27,28]

The group of Sumac treatment for the two periods showed normal sperm morphology and count. Authors suggested that Sumac rich with Saponins [29], increase the level of testosterone produced by Leydig cells by affecting on pituitary LH [30] and this increase sperm parameters by enhancing of serum gonadotropin [31], other researchers suggested both of FSH and LH hormones affecting on testosterone level which is increase sperm count and viability [25].

Table (1) Effect of oral administration of MTZ and sumac on sperm morphology (% abnormal morphology± SE)

period of treatment / Type of treatment	14 days	28 days
Control	$6^{a}\pm1$	$8^{a}\pm1$
MTZ	$34^{b}\pm1.225$	$36^{b}\pm1.517$
Sumac	$9^{a}\pm1.414$	$11^{a}\pm1.414$

The different letters refers to significant differences ($P \leq 0.01$) the similar letters are non-significant differences

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دراسة تأثير عقار الميترونيدازول والسماق على انسجة الخصية والنطف لذكور الفئران البيض

سعد توفيق رشيد ، اسماعيل إبراهيم حسن ، مصطفى طالب خلف

كلية الطب البيطري ، جامعة تكريت ، تكريت ، العراق

الملخص

في هذه الدراسة تم استخدام ثلاثون حيوان من (ذكور الفئران البيض السويسرية) بمعدل وزن سبعة وعشرون غم حيث تم ايوائها في البيت الحيواني التابع لكليه الطب البيطري جامعه تكريت تحت ظروف طبيعية، قسمت الى ثلاثة مجاميع كل مجموعة تضم عشر فئران وللفترتين (اربعة عشر وثمانية وعشرون يوم)، المجموعة الاولى مجموعة سيطرة وتم معاملتها بالماء المقطر فقط، المجموعة الثانية تم تجريعها بالجرعة العلاجية الـ metronidazole (MTZ)(0.37 ملغم/فأر/يوم) للفترتين، المجموعة الثالثة جرعت بالمحلول المائي للسماق بمقدار 0.04 مل/فأر/يوم (للفترتين). تم اعطاءالعقار والسماق للحيوانات عن طريق الفم. وتم اجراء دراسة تاثير العقار والسماق على التركيب النسيجي للخصية بالاضافة التقييم النطف الذكرية للمجاميع الثلاثة. اظهرت النتائج فيما يخص التركيب النسيجي للخصية في المعاملات الاولى والثانية ولفترتي التجربة تغيرات معنوية مقارنة مع مجموعة السيطرة حيث كان هناك وجود تأثير سلبي واضح في المجموعة الثانية، تمثلت بخلو مركز النبيبات المنوية من النطف مع وجود خلايا لايدك في النسيج الخلالي بين النبيبات المنوية باعداد محددة ومتراصة مع بعضها، في حين ان تأثير المجموعة الثالثة كان اقل حدة. وتناولت الدراسة ايضا تأثير عقار الـ MTZ والسماق على نسبة التشوهات النطف الذكرية، حيث كان لعقارMTZ تاثيرات عالية المعنوية ($P\leq0.01$) في ظهور تشوهات النطف مقارنة بمجموعة السماق والسيطرة، بينما لم يكن هناك تأثير معنوي بين مجموعة السيطرة والسماق في نسب تشوة النطف.