The Effect of Low Dose Capsaicin on Ovarian Histological Structure in Induced Polycystic Ovary Syndrome in Adult Rats

Original Article

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ABSTRACT

Introduction: Capsaicin could contribute effectively in many aspect functions, but its effects of polycystic ovary syndrome (PCOS) have not been examined yet.

Aim of the Work: To investigate capsaicin effects on the enhancement of polycystic vary syndrome (PCOS).

Materials and Methods: Female rats were examined for the estrus cycles (EC) for about 5 days to constantly ensure its stability. The total number of females used in the current study was 35 animals. They were divided into five groups: (CMC, n=7) carboxymethyl celluose), The (PCOS, n=7), alcohol negative control group (- alcohol, n=7), capsaicin positive control group (+Caps., n=7), and (Letz. + Caps., n=7) group. The generalization of PCOS lasted for 21 days, and the capsaicin treatment continued for 21 days also. All females were weighed and sacrificed to examine the histological changes of the ovary after (PCOS) induction and all treated groups, blood samples collected from all animals to estimate serum LH, FSH, insulin and testosterone levels.

Results: Body weight was normal in CMC group, compared to PCOS group while it decreased in alcohol(- control), (+Caps.) and significantly enhanced in (Letz. + Caps.). The level of testosterone was significantly elevated in PCOS group compared to other groups which appeared significantly decreased, the insulin level increased significantly in PCOS group compared to (Letz.+ Caps.). The histological examination of the ovary in PCOS showed multiple cysts (more than five in number), disappeared corpora lutea, and hemorrhage. While in the (Letz. + Caps.) treated group showed enhancement of ovarian histological tissues, the cysts was disappeared, and multiple corpora luteum appeared in the cortex and the huge of blood vessels observed in the medulla when compared with positive control and alcohol administration groups.

Conclusion: Capsaicin has significantly enhancing the histological changes of PCOS ovarian that induced in rats.

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Key Words: Capsaicin, letrozole, polycystic ovary syndrome.

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INTRODUCTION

Polycystic ovary syndrome (PCOS) isn't a recent disease, it was described three hundred years ago by the scientist Vallisneri but Stein and Leventhal were the first to study their symptoms[1]. Polycystic ovary syndrome is classified as a disorder because it is accompanied by many physiological and morphological symptoms, such as changes in ovarian volume, and stromal density in addition to metabolism changes[2,3,4]. The first morphological sign is hirsutism, which refers to the presence of dark hair in undesirable regions, in addition to an increase in body weight[5] and lastly it may lead to obesity[6,7]. Nowadays, the PCOS attracts more attention from researchers because it is not just a hormonal disorder that poses a health risk, it also causes economic risks. It costs more than a billion dollars to treat the mentioned morbidities associated with PCOS, such as hirsutism, obesity, infertility treatment, and continuous drug consumption to manage related diseases like diabetes mellitus[8]. There are various methods for treating or reducing PCOS, such as using medication to regulate hormone levels[9] but, the life style changes remain more important[10]. Alwan, *et al*. and Tsenkova, *et al*. suggested that following a regular diet can help in the reduction of body weight and manage polycystic ovary syndrome (PCOS), such as Cinnamomum is also used for weight management and reducing PCOS symptoms[11,12]. In addition Additionally, ginger extract has been used to manage PCOS.[13]. Ginger contains effective compounds, such as capsaicin, which can enhance the taste and flavor of food and are commonly found in chili peppers[14]. Studies have shown that capsaicin, with its antioxidant activity, offers numerous health benefits[15]. Moreover, capsaicin has been utilized for weight management[16]. However, it's important to note that weight loss is not the primary focus when managing PCOS[17]. Capsaicin is a chemical compound found in chili peppers that is responsible for their burning and irritant effects[18]. It is a chemical irritant and neurotoxin for mammals, including humans, and produces a sensation of burning in any tissue when it comes into contact except birds it doesn't feel the capsaicin taste[19].

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Capsaicin and several related amides (capsaicinoids) are produced as secondary metabolites by chili peppers, probably as deterrents against certain mammals and fungi capsaicin is used as an analgesic in topical ointments and dermal patches to relieve pain, typically in concentrations between 0.025% and 0.1%[20]. Based on the above data this work aimed to study the effect of capsaicin on polycystic ovary in adult albino rats histologically, histochemical and biochemically for some hormones.

MATERIAL AND METHODS

Drugs and Chemicals

The carboxymethyl celluose (CMC) (SDFCL, Mumbai, India), powder 0.5 mg/kg was dissolved in 95% distal water (vehicle). The letrozole was administrated orally (1 mg\kg) using 1% aqueous solution of carboxymethyl celluose (CMC) (Sigma-Aldrich\Germany) as a vehicle solution[21]. Capsaicin (sigma Aldrich, German) was prepared for oral administration by dissolving in a vehicle solution (0.5 mg\kg) of capsaicin was dissolved in 0.5 ml of absolute ethanol, then the mixture completed to (100 ml) by distilled water.

Experimental design

Adult female Norwegians\rats (n=35), (14-16 weeks old, weighing 170-200g). The animals were housed in plastic cages, lined with a standard environmental conditions that's includes (temperature 25 ± 2C°, humidity about 55 ± 10%) and constant light\dark cycle. The rats have been fed with standard pellet diet and water ad labium. Animals were divided as the following.

First experiment induction of PCOS: Animals are divided into two groups

1. Negative control group: (CMC, n=7) which received (the vehicle) (0.5 ml aqueous solution of carboxymethyl celluose) orally by (gavage) one does per day for 21 days.
2. Induction of PCOS group: (n=7, PCOS) group have regular (EC) used from (n= 14) the animals were induced the PCOS. They received letrozole at a concentration of 1 mg/kg dissolved of carboxymethyl celluose solution, orally by (gavage) once daily for 21 days. Female rats of negative control group (n=7, CMC) and seven females rats (n=7, PCOS) group were anesthetized and scarified after 21 days, blood samples were collected by cardiac puncture for serum hormones tests like testosterone, FSH, LH, and nsulin. Ovaries from each groups were separated and kept in 10% formalin for histological and histochemical study.

Second experiment treated of PCOS: Include the following totals groups

3. Negative control group: (-alcohol , n=7), animals were received (0.5 ml) from ethanol completed into 100 ml by distilled water, this vehicle was given for animals orally by gavage.
4. Positive control group: (+Caps., n=7), animals were received (0.5 mg\kg) of capsaicin dissolved of vehicle ethanol alcohol orally by gavage once daily.
5. Letrozol + Capsaicin (Letz. + Caps., n=7) seven of rats from PCOS group previously done as therapeutic group, were induced PCOS by receiving Letrozole 1 mg\kg BW, dissolved of carboxymethyl celluose solution, orally once daily by oral gavage for 21 days then animals received at the same capsaicin (0.5 mg\kg) was dissolving in alcohol (0.5 ml%) orally by gavage. The duration of treatments about (21) day. At the end experiment the female rats were anesthetized and scarified, the blood samples were collected by cardiac puncture for serum hormones tests such as Testosterone, FSH and Insulin. Ovaries were isolated and fixed on formalin 10% for histological and histochemical study

Ethical Approval

The ethical approval was obtained from the Veterinary Medicine at Basrah University (No: 4 9-01 8,2).

Determination of estrus cycle

For the determination of the estrus cycle (EC) and to assess the (EC) regularity daily a vaginal smear examination was accrued for each rat. Briefly, vaginal secretions were by using a normal saline which pushed into vaginal by sterile eye drop about 2-3 drops, and pulled the secretion in the same time, after that's puts the drop in the clean glass slide as soon as added one drop of Giemsa stain (Jourilabs, Ethiopia) then added cover slip in order to examination under light microscope (x400 objective). Microscopically the smear has been assessed for predominate nucleated epithelial cell (proestrus phase), cornified epithelial cells predominant (estrus phase), both cornified squamous epithelial cells and leukocytes referred into (metestrus phase) and predominate leukocytes indicated the diestrus phase[22].

Body weight

The body weight was recorded for all groups from the beginning of the experiment to the end for 21 days.

Biochemical parameters (hormones)

The effects of capsaicin on the letrozole induced PCOS were investigated after 21 day. After treatment animals were sacrificed, a blood specimens were collected from each rat by heart puncture technique, serum was isolated by centrifugation at 3,500×g for 10min at 25C° serum of Follicle stimulating hormone(FSH), testosterone, insulin and luteinizing hormone (LH) levels were determined by ELESA commercial test kits (Sun-Lung, China) according to the manufacturer's instruction

Histological examination

Both ovaries were isolated to determine the histological changes for all the studied groups. The isolated ovaries were fixed in 10% formalin immediately, dehydrated in alcohol, cleared with xylene, infiltrated with molten wax, blocked, trimmed with microtome and the histologic slices were stained with (H&E). The histologic section were examined under light microscope

Histochemical examination

The ovaries were isolated, fixed in buffered formalin (10%), dehydrated in an ascending series of ethanol 50%, 70%, 80%, 90%, 100% and once again 100%, cleared in xylene, embedded in paraffin sectioned (thickness= 5µm), mounted on slides, and stained with Mallory's stain for histochemical study Mallory's stain: Chemical compounds and protocol:

A- Chemical compounds

1. Acid fuchsin (0.5 gm) prepared by it dissolved in (100 ml) distilled water
2. Aniline blue–orange G solution prepared by dissolved (0.5 gm) from aniline blue, orang G (2 gm) and (1gm) from phosphotungstic acid were dissolved of distilled water (100 ml).

B- Protocol

All slides were deparaffinized, rinsed and hydrated in distilled water, passed through acid fuchsin solution about 5 minutes, then immediately the sections were passed through aniline blue-orang G solution about 30 minutes or longer and dehydrated in 95% alcohol, absolute alcohol and clear in xylene, finally mounted canada balsam[23].

Statistical analyses

The results were expressed as mean ± standard deviation (M±SD), the experiment was analyzed by using One-way ANOVA, the statistical analysis was performed by SPSS version 21.0. The least significant difference test (LSD) was used to determine the differences between groups in ANOVA-test, the level significant set on ($p< 0.05$).

RESULTS

Determination of Estrus Cycle

The daily observation of EC results represented that the CMC normal EC has four phases compared with the PCOS group that has abnormal EC. This abnormal EC showed mostly appearance in one or two phases only, which is characterized by the prominence of the cornified epithelial cells in contrast with the control groups. The treated group with capsaicin also showed a regular estrus cycle. In brief, the nucleated epithelial cells were referred to proestrus phase, the estrus phase showed clusters of cornified epithelial cells, the presence of nucleated with few leukocyte cells indicator of the metestrus phase. Whereas the presence of many leukocyte cells referred to diestrus phase (Figure 1)

Body weight gain

The effect of capsaicin on polycystic ovary induction is shown in (Table 1). The results of the initial BW showed non-significant differences between all groups while data from the final BW showed a significant differences between all groups. While, data of final BW significant (P<0.05) increased in (CMC) and (PCOS) groups as compared to other control groups. Also BW Gain increased significantly (P<0.05) in PCOS group more than other treated groups while, it significantly (P<0.05) decreased in (-alcohol) control orally group and Capsaicin (+Caps) orally groups compared to the CMC control and PCOS groups. whereas, the (Letz. + Caps.) showed enhanced of the body weight gain compared with PCOS and CMC groups. Also appeared significant differences between initial and final BW within groups that appeared increased significantly in PCOS group and CMC group rather than to other groups appeared non-significant differences.

Biochemical parameters (hormones)

The level of FSH appeared normal in CMC, While, the level of FSH decreased significantly (P<0.05) in PCOS group as compared to the (CMC) control group and other groups. On the other hand, the level of LH significantly (P<0.05) decreased in (CMC), while the LH increased significantly (P<0.05) in PCOS group rather than in the CMC) and other groups. The testosterone levels were significantly (P<0.05) elevated in PCOS group in comparison to (CMC) and other groups which appeared significantly (P<0.05). The FSH in the (-alcohol) control and (+Caps) showed that it was normal compared with (PCOS) group. While the LH levels was significant were decreased in the (-alcohol) and (+Caps) group. The insulin levels were normal in (-alcohol) and (+Caps.) compared with (PCOS) group . Regarding the results of insulin level, it declined significantly in the group of (Letz. + Caps.) as compared to all groups. There are no significant differences in the level of insulin between other treated and control groups (Table 2).

Histological structure

The ovaries of the control group that received (CMC) only appeared with multiple corpora lutea (Figure 2A) when they were examined under a light microscope with hematoxylin and eosin, multiple primary and secondary follicles, and the medulla appeared normally neutralized with blood vessels (Figure 2B). The most important changes occurred in the ovary tissues in the (PCOS) group were noticed the multiple cysts (more than five in number) of the cortex, the corpus luteum and follicle stages disappeared (Figure 3A). The cyst appeared surrounded by elastic fibers connective tissues and filled with fluid, numerous of inflammatory cells and vacuolated appearance (Figure 3B) and hemorrhage noted in the medulla, vacuolated and damaged of granulosa cells (Figure 3C), compared with the ovarian histologic structure of control groups (Figure 2). Normal ovarian histological appearance

of (-alcohol) and (+Caps.) groups, (Figures 4 A,B) compared with (PCOS) group. The capsaicin (Caps. + Letz.) treated group showed enhancement of ovarian histologic tissues, while the cysts were reduced, multiple corpora luteum appearance in cortex, in addition to development of ovarian stages. The examined tissues in (Letz. + Caps.) observed the huge of blood vessels in medulla, (Figures 5 A,B) when comparing with PCOS group.

Histochemical study

Normal ovarian histochemical with (Mallory's stain) in carboxymethyl cellulose (CMC) showed that bundles of the collagen fibers had blue color surrounded the follicles , multiple of the ovarian stages such as corpora luteum, primordial and primary follicles, normal blood vessels distributed (Figure 6). The (PCOS) group showed that multiple cysts (Figure 7A), the cyst observed surrounded by elastic fibers and filled with fluid (Figure 7B). Histochemical study showed that the erythrocyte appearance, few of the inflammatory cells and numerus of the stellate cells in addition to the vacuolated, the collagen fibers observed decreased (Figure 7C) compared with (CMC) group. The (-alcohol) control group showed that normal developed of the corpus luteum (Figure 8A), primordial and primary follicles and the blood vessels normal distributed in medulla and surrounded the follicles (Figure 8B), collagen fibers noticed surrounded the blood vessels and follicles (Figure 8C) compared with PCOS.

The (+Caps.) control group showed that normal ovarian structure with multiple of the corpora luteum (CL), normal developed the corpus luteum, the mature follicles were appearance, primary Oocytes clearly noticed and normal distributed of the blood vessels on the medulla (Figure 9A). Normal degenerated of corpus luteum for transfer into the last stage the corpus albicans, mature follicle has antrum was contained follicular fluid, the Oocyte observed surrounded by the corona radiate and blood vessels noted normal distributed in the medulla (Figure 8B). The collagen fibers appeared surrounded the blood vessels and follicles (Figure 8C) in comparison with PCOS and other groups. While, the (Letz. + Caps.) treated group showed that decreased of cysts, enhancement of the cortical connective tissue, hemorrhage also disappeared and the huge of blood vessels were noted in medulla surrounded by the thin strands of the collagen fibers (Figures 10 A,B,C) compared with (PCOS) group.

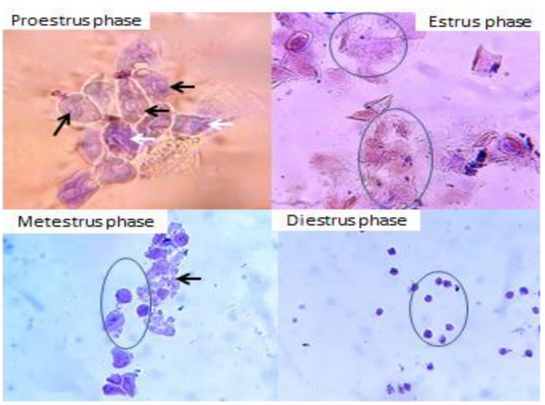

Fig. 1: Cytological appearance of regular estrus cycle shows (Proestrus phase) has nucleated epithelia cells (black arrows) and cornified cells (white arrows), (Estrus phase) clustered of cornified epithelial cells (circles), (Metestrus phase) shows clusters of leukocyte cells (black arrow) and nucleated cells (circle) and (Diestrus phase) shows collection of leukocyte cells (circle) under light microscope (Giemsa's stain: x400)

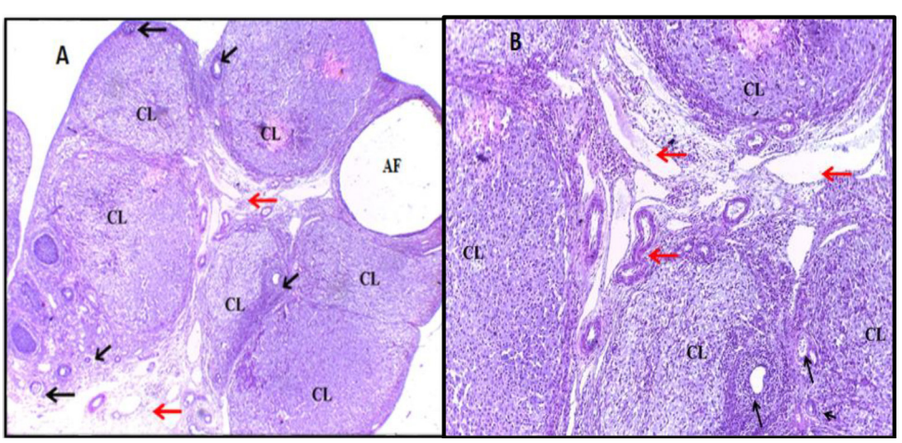

Fig. 2: Sections of ovary from CMC negative control group showed (A:) normal histological structure, multiple corpus luteum (CL) and one atretic follicle (AF), with (x40) and (B) development of ovarian structure (black arrows), normal distribution of blood vessels in medulla (red arrows) under light microscope with (H&E)(x100).

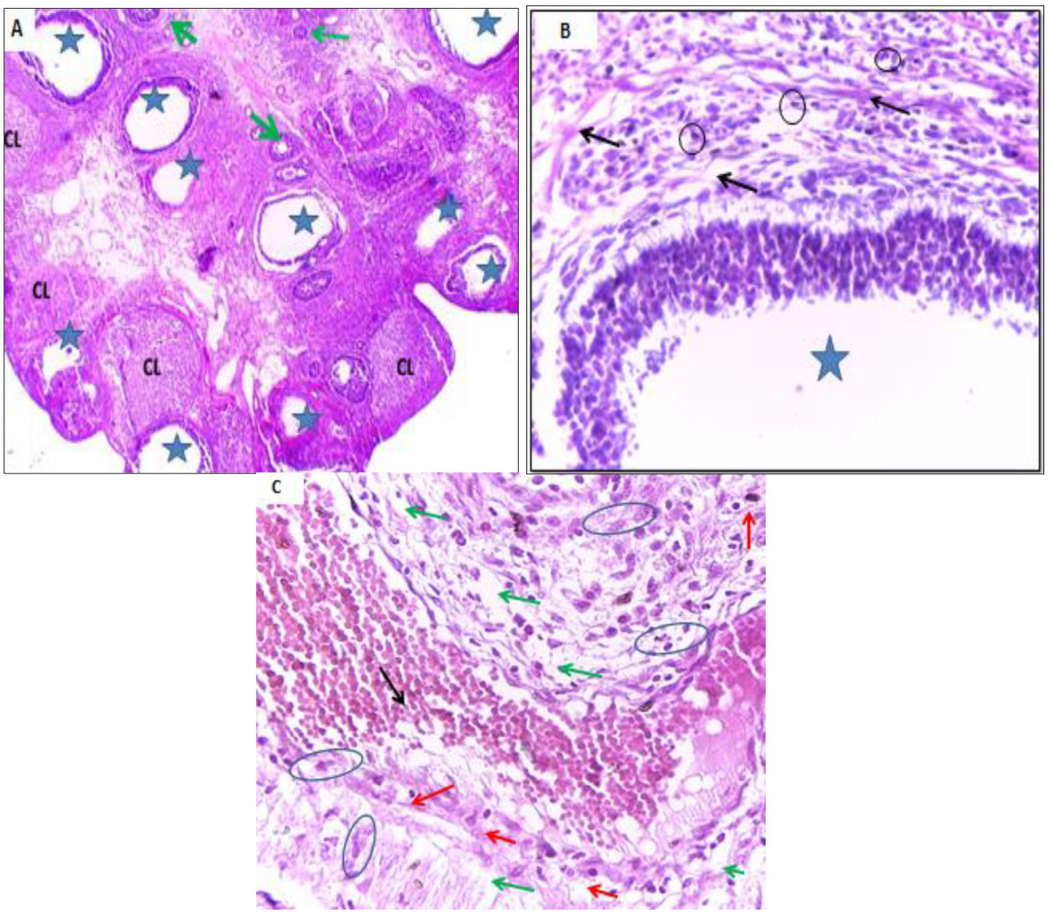

Fig. 3: Histological sections of ovary from polycystic ovary syndrome group (PCOS) induced by letrozole (Letz.) show multiple cysts (stars), few of corpus luteum (CL) and reduced of follicles (green arrows) with (x40). (B): The cyst surrounded by dense fibers connective tissue (black arrows) that filled with fluid (star), numerous of fibroblast cells (circle) (x100) and C: Hemorrhage indicted by (black arrow), vacuolated (green arrows), damaged of granulosa cells (red arrows) and inflammation cells (circles) (x100) under light microscope with H&E stain.

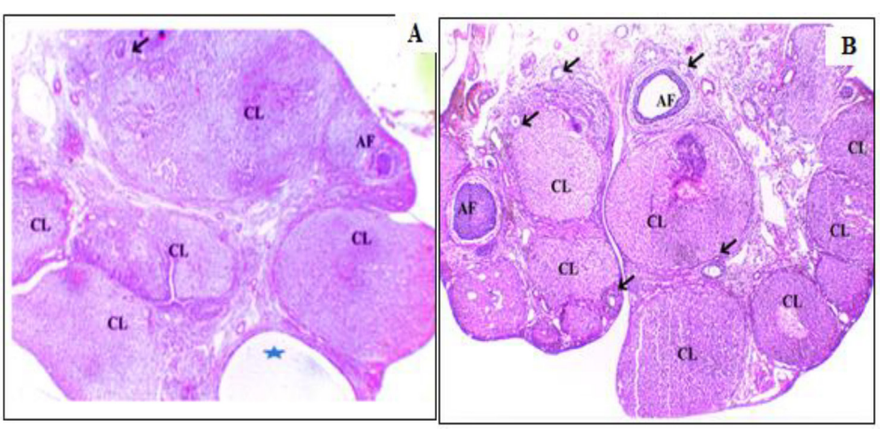

Fig. 4: (A) Normal sections of histologic ovarian from alcohol administration negative control group showed that un-functional follicle cyst (star) and multiple corpora lutea (CL) with (x40). B: Normal ovarian structure of capsaicin (+Caps.) as positive control group show multiple corpora lutea (CL) and follicles development (black arrows) with (x40)

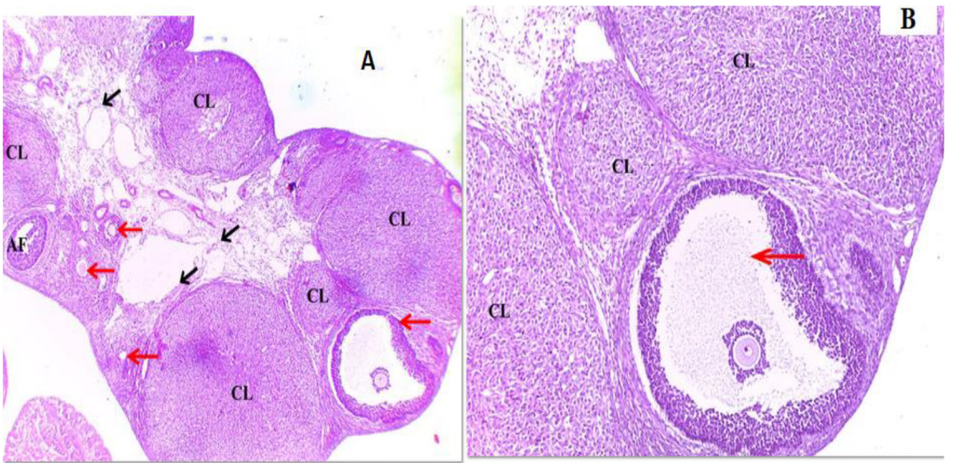

Fig. 5: Histological sections of ovary in (Letz. + Caps.) treated group showed that (A: x40) multiple corpora lutea (Cl), huge of blood vessels (black arrows) and development of follicles ovarian stages (red arrows). (B: x100) secondary follicle and corpus luteum (CL) (x100). Under light microscope and stained with (H&E).

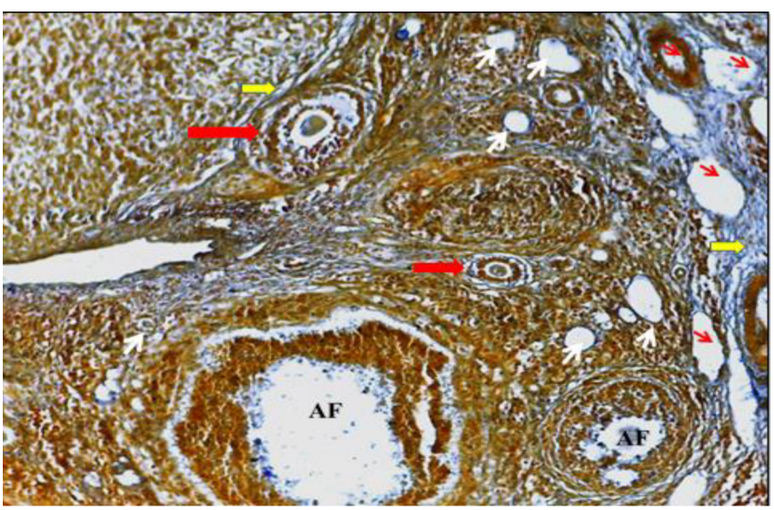

Fig. 6: Histochemical sections in (CMC) group showed that multiple of the primary follicles (red arrows) and primordial follicles (white arrows), few of the atretic follicles (AF), bundles of the collagen fibers (yellow arrows) and normal blood vessels (red arrows) (x100 :Mallory's stain)

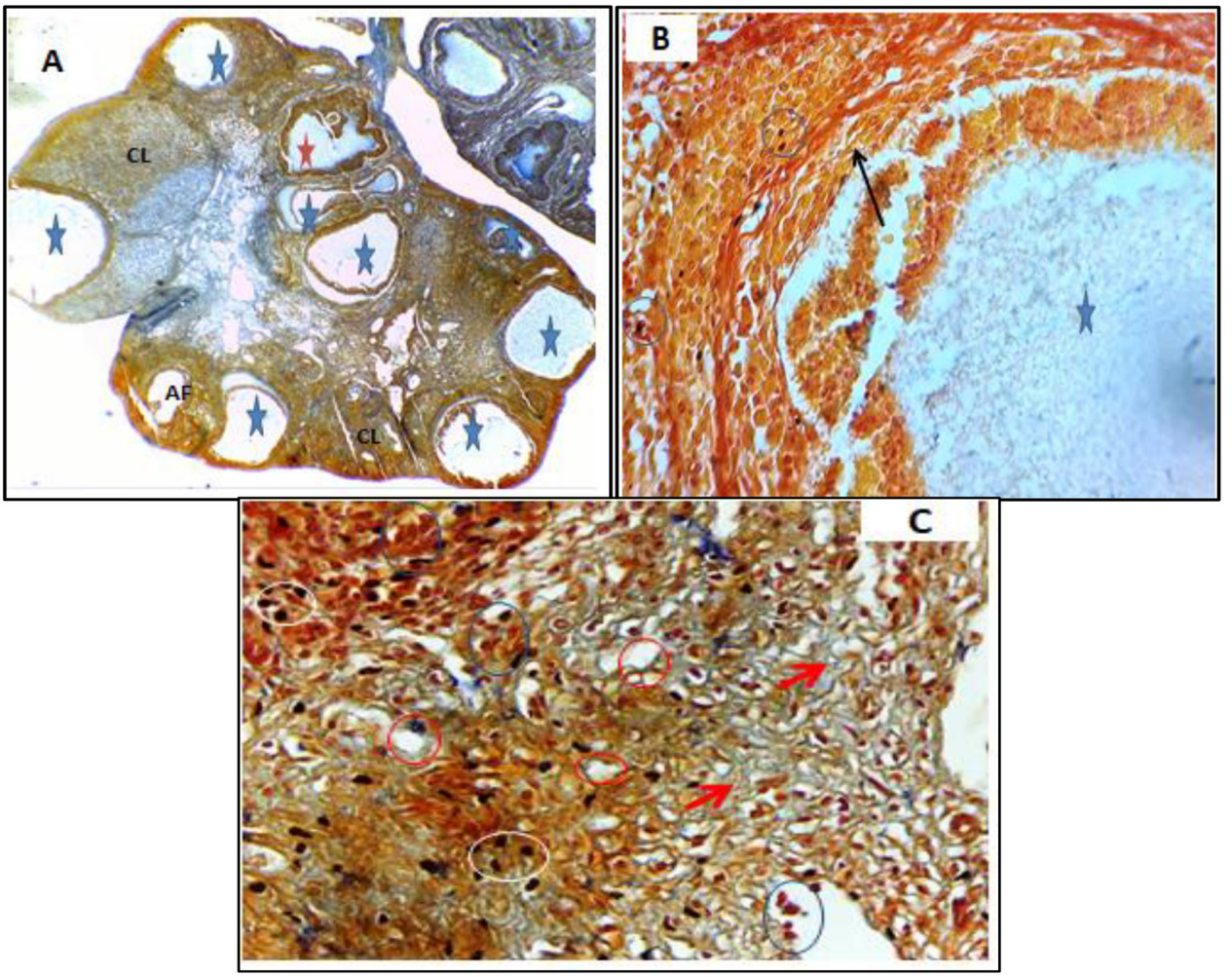

Fig. 7: Sections of ovary stained with (Mallory's stain) from (PCOS) group show (A: x40) multiple cysts and few of corpora luteum (B: x100) cyst filled with fluid and surrounded with elastic fibers connective tissue (C: x400) showed that the erythrocyte (blue circles), vacuolated (stars), satellite cells (white circles) and thin and third interrupted of collagen fibers (red arrows) (Mallory's stain: under light microscope)

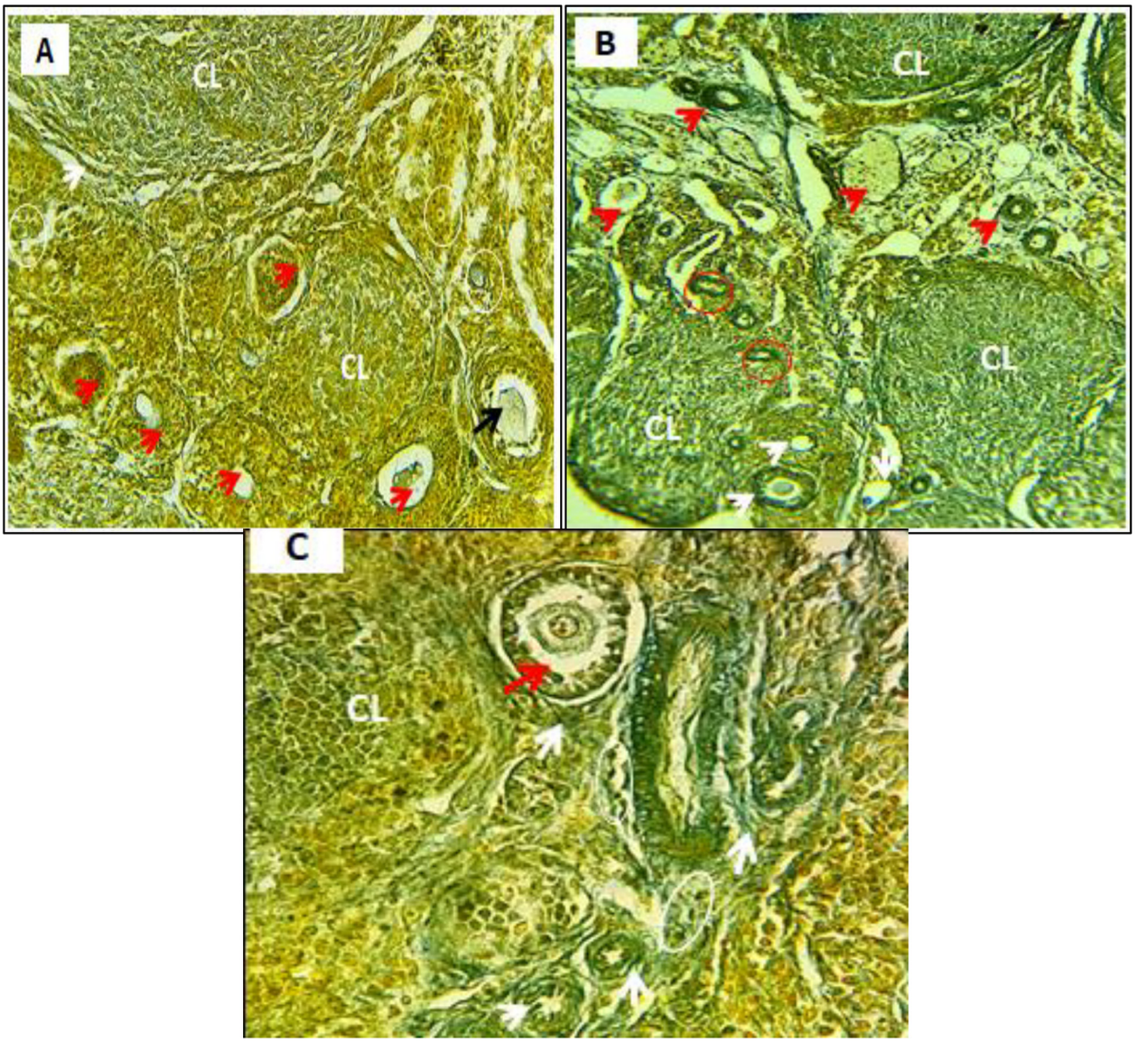

Fig. 8: Histochemical sections of ovary in (- alcohol) control group showed that (A: x100) normal ovarian structure with multiple of the corpora luteum (CL), development of corpus luteum, primary follicle (black arrow) and primordial follicles (white circles). (B: x100) the normal distributed blood vessels in medulla (red arrows), vesicular follicles (red circles) and multiple of the primary follicles (red arrows) and (C: x400) showed that the collagen fibers surrounded the blood vessels and follicles (white arrows), fibroblast (white circle) and primary follicle appearance (red arrow) with Mallory's stain

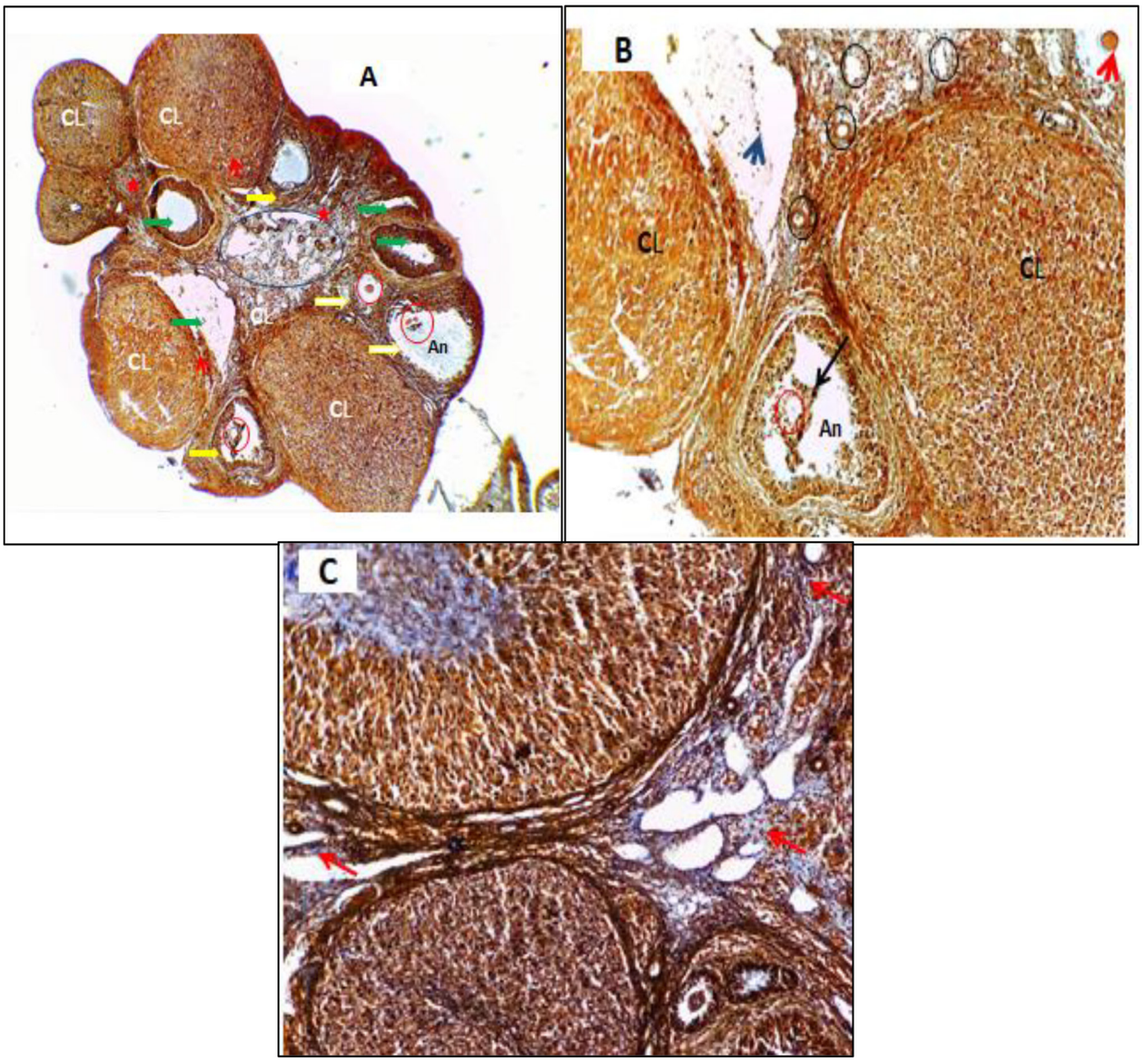

Fig. 9: Sections of ovary stained with (Mallory's stain) from (+Caps) control group showed that (A: x40) normal ovarian structure with multiple corpora luteum (CL), developing corpus luteum (green arrows), multiple of the mature follicles (yellow arrows), primary Oocytes (red circles) and normal distributed of the blood vessels (big circle) on center of the medulla. (B: x100) showed that degenerated of corpus luteum (blue arrow), mature follicle (black arrow) has antrum (An) contained follicular fluid, Oocyte surrounded of corona radiate (red circle) and huge distributed blood vessels (black circles). (C: x100) collagen fibers surrounded the huge of the blood vessels and follicles (red arrows).

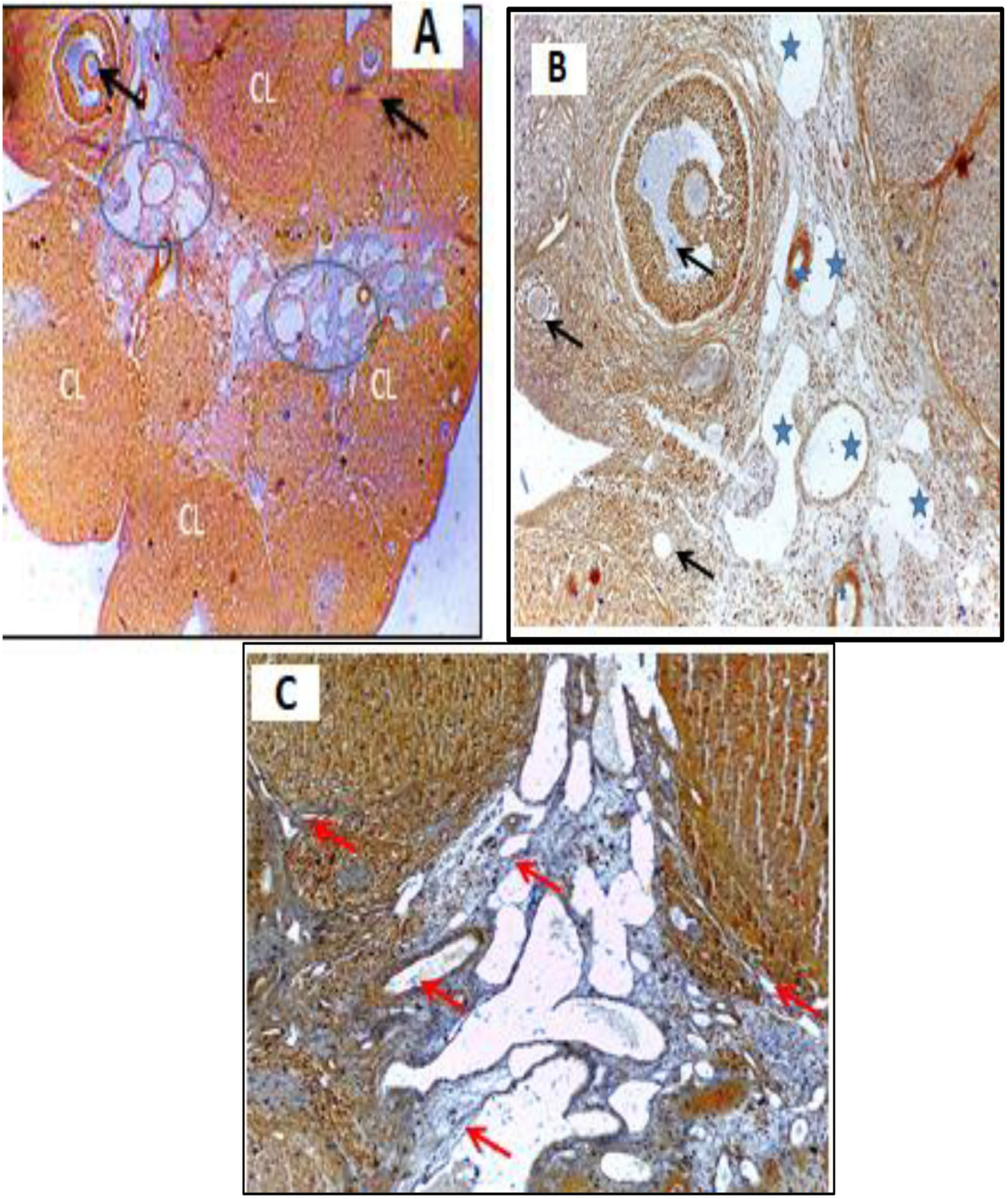

Fig. 10: Sections stained with (Mallory's stain) from (Letz. + Caps.) treated group showed that (A: x40) normal ovary structure has multiple corpora lutea (LC), developed ovarian stages (black arrows) and huge of blood vessels (circles) (B: x100) observed clearly huge of blood vessels (stars) and developed of ovarian follicles and mature follicle (black arrows). (C: x400) collagen fibers surrounded the follicles and blood vessels in medulla (red arrows)

Table 1: Effects of capsaicin (Caps.) treatment on PCOS induced by letrozole (Letz.) on body weight in rats

Groups	Initial BW	Final BW	BW Gain
CMC	184.14±20.65^{Ab}	240.57±19.20^{Aa}	56.42±26.07^{A}
PCOS.	182.12±16.86^{Ab}	241.00±18.15^{Aa}	58.88±19.28^{A}
- alcohol	178.57±15.71^{Ba}	175.85±15.30^{Bb}	-3.14± 1.95^{C}
+ Caps.	200.00±17.69^{Aa}	197.42±18.53Aa	-3.00± 1.79^{C}
Letz. + Caps.	170.14±21.02^{Bb}	178.85±15.30^{Ba}	8.57± 3.69^{B}
LSD	27.14	14.78	12.42

Capital latter denote to differences between groups, Small letters denote to difference within groups, (CMC) carboxymethyl celluose, (PCOS) polycystic ovary syndrome induced by letrozole, (Letz.) letrozole and (Caps.) capsaicin.

Table 2: Effects of capsaicin (Caps.) treatment on PCOS induced by letrozole on reproductive hormones and insulin in rats

GROUPS	FSH	LH	TESTOSTERONE	INSULIN
CMC	0.726±0.044^{A}	1.094±0.575^{C}	0.815±0.191^{C}	8.757±0.816^{B}
PCOS	0.491 ±0.053^{B}	1.808±0.321^{A}	1.563±0.84^{A}	10.898±1.75^{A}
- alcohol	0.728±0.044^{A}	1.094±0.575^{C}	1.115±0.191^{B}	8.734±0.799^{B}
+Caps.	0.759±0.035^{A}	1.077±0.156^{C}	0.756±0.339^{C}	8.017±1.046^{B}
Letz. + Caps.	0.699±0.064^{AB}	1.464±0.302^{B}	1.078±0.294^{B}	8.354±0.847^{B}
LSD	0.272	0.366	0. 133	0.558

(A) very highly Significant differences between groups, (B) high significant differences between groups, (C) less significant differences between groups, (CMC) carboxymethyl celluose, (PCOS) polycystic ovary syndrome induced by letrozole, (Letz.) letrozole and (Caps.) capsaicin

DISCUSSION

Pharmaceutical scientists adding to that, ethanol is considered nontoxic for most organisms at a concentration less than 5% wt.[20]. It is importuning nowadays to search for natural and new treatment that considered more efficient contrasting with current ones, additionally, the capsaicin has importance in loosing body weight and decreased insulin level that considered necessary in treating PCOS[16]. Previous studies had also shown that capsaicin may has a good role in enhancement of women fertility[24,25]. while it's not implemented in PCOS treatment yet. The capsaicin was dissolved in ethanol because of its low solubility in water, adding to that, the ethanol considered nontoxic for most organisms at concentration less than 5% wt.[20].

The induction of polycystic ovary syndrome and formation of multiple cysts in the ovary can be induced in female rats using multiple hormones or using a diet with high fat[26]. In the current study, we induced PCOS by the letrozole[21,26]. The vaginal smear and hormone levels showed abnormalities in the rats that received letrozole according to histologic examination. The current study showed that the induction of PCOS was successful with letrozole due to cornification in vaginal smears that differ from regular EC, which was described in previous studies[27]. Many natural drugs were used to treat PCOS, here we used capsaicin as a natural and beneficial compound that can restore EC regularity. As well as, the results of the current study have also proven that body weight gain was increased with PCOS, which is compatible with[28,29]. The (CMC) normal increased of the body weight gain compared with PCOS group. While, the alcohol (-control) and (+Caps) groups showed a decrease of body weight gain compared with (CMC) and (PCOS) groups that agreed with few previous studies showed that despite of alcohol had risk for caused many diseases but it enhanced the metabolism and energy intake when of the little amount and decreasing consumption[30,31,32]. Capsaicin also had very beneficial effects on management the body weight[33] Recently research has been interesting on healthy life especially that related to food that decreases body weight[34]. Study showed that (CMC), (-alcohol) and (+Caps.) control groups recorded normal significant sex hormones and insulin levels. While the (PCOS) group revealed a high drop in FSH and high levels of LH, this result was similar to[35]. The results revealed that testosterone hormone levels were significantly increased after PCOS induction, these results agreed with Ashraf *et al*.[36]. who reported a significant increase in testosterone levels in PCOS women. The insulin level in PCOS group was high level to the control groups, and according to[37] insulin resistance and PCOS may associated with high-fat in diet[38]. Results confirmed that, the (Letz + Caps.) group showed that regulate the FSH, LH, Insulin, and Testosterone hormones, in contrast with (PCOS), The capsaicin treated group also decreased in insulin levels these finding was satisfied by[39,40]. Some studies indicated that capsaicin supports the skeletal muscle in glucose uptake[41], it enhances glucose uptake by increasing the activity of calcium regulation in skeletal muscle[42]. In the histological present study, the results revealed that normal ovarian structure in the (CMC), (-alcohol) and (+Caps.) control groups. While, the (PCOS) group has significant increase of the Follicle cysts, which filled the cortex, while the corpora lutea disappeared. The number of primary and secondary follicles decreased in comparison with the control groups, these results were in line with Jelodar *et al*.[43] who indicated that the low number of corpora lutea refers to disorders of the ovulation, which leads to PCOS that may cause LH to be to increased, which is considered as a vital line of ovulation development. The (Caps. + Letz.) treated group showed enhancements of histological symptoms represented by the cysts disappearance, and appearance of many corpora luteum, which is supported by previous studies which explained that various mechanisms showed that capsaicin can activate ion channels receptor TRPV1[44]. As a result of the consumption of capsaicin, nitric oxide synthase is released which stimulates the reproductive system nitric oxide synthase is described as an important enzyme that expresses three forms that are required to get a healthy ovarian tissue[25].

The study used histochemical to support histological and physiological result. The histochemical process was used to provide very beneficial details for diagnosis of histological and pathological alteration in several organs[45]. The Mallory's stain used into differentiated between

connective tissues especially for indicated both of collagen and elastic fibers in ovary[46,47]. The cortex and medulla on ovaries in (CMC) appeared normal, a bundles of collagen fibers appearance. The ovarian tissues of the (-alcohol) control group appeared normal distributed the collagen fibers, multiple of corpus luteum noted which observed degenerated may be ready to transfer into corpus albicans. While, The connective tissues of cortex and medulla in (PCOS) noted with multiple changes erythrocytes noted, increased inflammatory cells, numerus of the satellite cells and vacuolated. In addition reduced of the collagen and increased of elastic fibers, collagen fibers observed thin and interrupted that surrounded the granulosa cells when comparison with control groups. A similar study showed that the collagen fibers were decreased in the ovary has Polycystic ovary syndrome[48]. The (Letz + Caps.) showed that enhancement of ovarian connective tissues the mature follicles appearance and huge of blood vessels observed in medulla surrounded by the bundles of collagen fibers in compared with PCOS group, previous studies showed that several types of collagen were distributed in different regions in the different stages of the ovaries[49,50].

CONCLUSIONS

Histological ovarian improvement symptoms of PCOS were observed in rats treated with capsaicin. It was also noted that capsaicin had a role to play in maintaining weight stability and maintaining the level of the blood hormone insulin. We recommended our current study to introduce an immunohistochemistry study to support histopathological exam and also we recommended the use of a wide range of capsaicin concentrations to test its effectiveness with (PCOS.).

CONFLICT OF INTERESTS

There are no conflicts of interest.

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الملخص العربى

تأثير الجرعة المنخفضة من الكابسيسين على التركيب النسيجي للمبيض في متلازمة تكيس المبايض المستحث في الجرذان المختبرية

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المقدمة : يمكن أن يكون للكابسيسين تأثيرات مشتركة على العديد من الوظائف الصحية ، ولكن لم يتم فحص آثاره على متلازمة تكيس المبيض المتعدد(PCOS) حتى الآن.
هدف العمل : للتحقق من تاثير الكابسيسين في تحسين (PCOS).
المواد وطرق العمل: تم فحص الحيوانات لدورات الشبق (EC) حوالي ٥ أيام باستمرار لضمان توحيد دورة الشبق العدد الكلي للحيوانات المستخدمة بالتجربة ٣٥. قسمت الاناث الى خمسة مجاميع : مجموعة السيطرة CMC, n=٧)) كاربوكسي مثيل سيليلوز و ((PCOS, n=٧ مجموعة متلازمة تكيس المبايض، مجموعة الكحول التحكم السالبةalcohol, n=٧), -) ، مجموعة الكابسيسين مجموعة التحكم الموجبة (+ Caps., n=٧)والمجموعة المعالجة باليتروزول والكابسيسين (Letz. + Caps., n=٧). استمرت الاستحثاث باليتروزل لمدة ٢١ يوم والمعالجة بالكابسيسين ايضا لمدة ٢١ يوم. كل اناث الحيوانات وزنت وتم التضحية فيها .لغرض الفحوصات النسجية بعد استحثاث التكيس وفحوصات الكيمياء النسجية. تم جمع عينات الدم من الحيوانات لتقدير مستويات LH و FSH و الأنسولين وهرمون التستوستيرون في الدم ، ولفحص التغيرات النسيجية للمبيض كمؤشر للمبيض.
النتائج: وزن الجسم كان طبيعيا في مجموعة (CMC) بينما انخفض معنويا في مجموعة ((-alcoholومجموعة ((+Caps. وتحسن الوزن في مجموعة مقارنة الى مجموعة الى مجموعة ((PCOS. مستويات هرمون التستوستيرون مرتفعة بشكل ملحوظ في مجموعة PCOS مقارنة مع جميع المجاميع الأخرى التي اظهرت انخفاضا بشكل ملحوظ. بينما انخفض مستوى الأنسولين بشكل كبير في مجموعة Letz +(.Caps.) مقارنة مع PCOS والمجاميع الاخرى. الفحص النسيجي في مبيض مجموعة (PCOS) أظهرت العديد من الاكياس (اكثر من خمسة اعداد), أختفاء الاجسام الصفر ونزف. ، بينما في المجموعة المعالجة بالكابسيسين أظهرت تحسن في الأنسجة النسيجية للمبيض ، حيث اختفت الأكياس، وظهور العديد من الجسم الأصفر في القشرة وظهور الأوعية الدموية الضخمة في لب المبيض عند مقارنتها بمجموعات السيطرة الموجبة ومجموعة سيطرة الكحول.
ألاستنتاجات: هناك تحسن معنوي في الاعراض النسيجية PCOS المستحث في مبايض اناث الجرذان.