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CORRELATION BETWEEN MDA AND TAOS IN LIVER OF COWS WITH GIANT LIVER FASCIOLA GIGANTICA

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Abstract

The present study was conducted with the aim of investigating the correlation between the oxidant (MDA) and the antioxidant TAOS in the livers of cows with giant fluke , Fasciola gigantica , liver disease . During the current study, which extends from 12/12/2021 to 30/7/2022, 1422 livers of cows and sheep were examined from the butchers who carried out the slaughter process outside the slaughterhouses in the city of Baquba, and 174 livers of cows, including 25 infected livers and 1248 sheep livers that did not show infection.

In this study, 25 liver samples with giant liver fluke, Fasciola gigantica disease and 14 uninfected liver samples were collected, homogenized and examined to measure the activity of malondialdehyde (MDA) and the antioxidant TAOS and find the correlation between them.

The results of the current study showed a correlation between antioxidants and oxidants in livers infected with liver , Fasciola gigantica and non-infected livers, as it was found that there is an inverse correlation between antioxidant TAOS with the oxidant MDA, as the Pearson correlation coefficient was recorded -0.018 .

Keywords: Malonialdehyde , Fasciola gigantica , Total antioxdants.

Introduction

Fasciolosis an economically important disease that affects domestic animals, especially cows, sheep and goats, and may affect humans incidentally, which is caused by infection with the liver fluke parasite of the genus Fasciola species F. hepatica and F. gigantica despite its importance as a count of neglected tropical diseases (NTD) (Oyarzun-Ruiz, 2019). The life cycle of the Fasciola is complex and includes two different stages. The first stage in the final host represented by the reservoir and the second stage in the intermediate host represented by aquatic snails, there may be a few differences in the life cycle of species of genus Fasciola, (Kurnianto et al, 2022). The spread of the parasite depends on the climatic seasons as the eggs begin (tropical and subtropical areas) in the rainy season to grow to the miracidium that enters the snails to complete its growth to the circaria (Zhang et al, 2020). The disease is characterized by being of a type chronic, acute or subacute and affects the bile ducts of the liver and is accompanied by edema, anaemia, anorexia loss of appetite and general asthenia leading to death (Caravedo and Cabada , 2020). Therefore, this disease causes huge economic losses in some countries

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that depend for their daily income on livestock and their products either by reducing their products and failing the quality of products or by the death of animals (Mpisana et al. 2022). The parasite in case of human infection may cause significant damage to the liver of the infected and thus cause liver dysfunction (Olivares_ ferretti et al., 2022) In some cases infection with this parasite may lead to secondary infection with bacteria such asbacillary icterohemo globinuria In livestock resulting from infection with types of bacteria in the bacteria Closteridium (Wagari, 2021).

Infection with this parasite leads to physiological, immune and biochemical changes of the host if the infection stimulates the host's immune system leading to the creation of immune and inflammatory responses as well as biochemical mechanisms and infection with this parasite has sometimes been considered a factor leading to the occurrence of oxidative effort (Jabbar, 2022).

Infection with the Fasciola parasite causes the release of active oxygen molecules (ROS) as immune response of host which resulting in damage to the tissue at the site of infection and that the increase in the immune reaction in the tissue by releasing these molecules that leads to expose the tissue to oxidative stress and the fibrosis resulting from the injury may be another source of oxidative effort through the development of tissue to produce free radicals to face injury and this requires the fabric to protect itself from those damages and roots so it may try to produce antioxidants to neutralize the effect of these harmful agents (Mendes et al, 2013).

The study of Khademvatan et al. (2019) indicated that the incidence among serological examiners was 50% in the city of Guilan in Iran by reviewing the results of studies conducted from 1999 to 2019. In Turkey, six cases were recorded in the eastern province of Van in the teaching hospital of Yuzuncu Yil University (Bayhan et al, 2020). A reference study that reviewed the results of previous ten-year studies (from 1999 to 2019) indicated that the incidence among livestock was 4.2% among sheep, and among cows was 9% while 3.1% were among goats (Khademvatan et al, 2019).

Materials and Methods

In this study, 1422 cows and sheep livers were examined from the butchers in the city of Baquba with the special information of each infected animal were taken. The samples were collected for the period from the twelfth of December 2021 until the thirtieth of July 2022. The samples were collected (include 174 livers of cows' and 1284 sheep livers) transferred (25 infected livers of cows and 4 non infected livers) to the Laboratory of Biology at the College of Education for Pure Sciences Department of Biology and the autopsy process was carried out.

The infected organs were thoroughly washed with water for the purpose of getting rid of blood, impurities and substances attached to them resulting from the slaughter process and placing the liver in a sterile dish where the outer surface of the liver was sterilized and then the liver was dissected to investigate worms.

The worms were isolated from the infected livers. The samples were then preserved by placing them in a PBS regulated phosphate solution. Then it is frozen at 20- until the homogeneous of worms is prepared.

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Three tissue biopsies of infected and non-infected liver (5 g per piece) were taken, (bile duct, closed to infected area , far from the infected area) were taken. The samples are placed in containers with phosphate buffer (PBS) and placed at a temperature of -20 °C.
The worms and livers were crushed and then 3ml of PBS was added and centrifuged at a rate of 3000 rpm for 30 minutes and at a temperature of 4 ° C. The floating part of the sample was taken.
The concentration of MDA and TAOS were measured according to the manufacturer's instructions of the kit (MDA , TAOS ELISA kit)

Results and Discussion

It is noted that there is a clear significant difference in the concentration of the total antioxidant index TAOS and MDA in worms and the studied areas of liver tissue (bile duct area, area near the site of injury and area far from injury). Moreover, the results show a significant difference in their concentration in the liver tissues of infected animals with liver fluke under study compared to control groups ($P<0.05$) as shown in Table (1) and Table (2).

Table (1): Rate of MDA enzyme concentrations in worms and studied areas.

Sex	Concentration rate µg/L				**P value**
	In worms	the bile duct	the liver area near the infection	the liver area far from the infection	
Male	**3.314±0.104**	**4.138±0.311**	**4.831±0.274**	**4.123±0.221**	**0.034**
Female	**4.312±0.218**	**4.432±0.259**	**4.621±0.101**	**5.521±0.310**	**0.022**
Total	**3.813±0.106**	**4.285±0.161**	**4.726±0.174**	**4.822±0.104**	**0.035**
Male control	**0.561±0.021**				**0.024**
Female control	**0.775±0.018**				**0.021**
Total	**0.688 ±0.024**				**0.027**
P value	**0.058**	**0.021**	**0.038**	**0.043**	

Table (2): TAOS concentration rate in isolated worms and studied areas of liver tissue.

Sex	**Concentration rate µg/L**				P value
	In worms	the bile duct	the liver area near the infection	the liver area far from the infection	
Male	0.554±0.080	0.866±0.061	0.988±0.032	0.631±0.021	0.024
Female	0.511±0.035	0.682 ± 0.077	0.716±0.041	0.616±0.047	0.043
Total	0.533±0.050	0.774±0.084	0.852±0.013	0.624±0.084	**0.031**
Male control	0.882±0.014				0.034
Female control	0.895±0.011				0.036
Total	0.889±0.033				
P value	**0.018**	0.041	0.025	0.048	

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The results of the current study showed a correlation between antioxidants and oxidants in livers infected with liver , Fasciola gigantica and non-infected livers, as it was found that there is an inverse correlation between TAOS with MDA oxidant, as Pearson's correlation coefficient was recorded -0.018 Through the results of the current study, it was noted that there is an inverse correlation between the oxidant MDA with the total antioxidant index TAOS, as the increase in the concentration of the oxidizing agent leads to a decrease in antioxidants, due to the high levels of free radicals, which lead to the process of peroxide fat, as the amount of antioxidants in the body may not be sufficient to neutralize oxidants, and therefore the levels of oxidants remain high (Skrzychi et al., 2011). This result is consistent with the results obtained by researchers Kolodziejczyk et al. (2005) who showed that infection with liver perforation in the laboratory led to an increase in the rate of oxidants and a decrease in the level of antioxidants in the serum of rats and the study concluded that the incidence of liver fluke leads to an increase in oxidative effort as the current study is consistent with the study of Nasreldin and Zaki (2020) who showed a significant increase in the value of MDA and a decrease in the value of TAOS in cows infected with liver fluke, and this study showed that the incidence of liver fluke is an oxidative stress factor that affects animals, leading to biochemical and metabolic changes in the liver resulting from injury and may lead to death. Studies have found inverse relationships between blood parasites load and total antioxidant levels, so the more severe malaria was appeared with the lower level of the total capacity of TAOS (Abdulkareem et al. , 2017; Gomes et al. ,2022). An increase in the concentration of MDA oxidative in the blood of malaria patients has also been observed and MDA oxidant is a by-product of lipid oxidation, which led to high levels of oxidative stress (Narsaria et al., 2012). Yeo et al. (2013) also showed a decrease in GSH antioxidant activity. In patients with malaria.

ROS generation has been reported to be improved during F. hepatica infection and this is a significant fact in connection with the decrease in antioxidants capacity of the host liver after invasion by F. hepatica, which was demonstrated by decreased activity/level of essential cellular enzyme f Non-enzymatic antioxidants shown in previous studies (Siemieniuk et al., 2008).

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