

Comparative Study of Biochemical Profile of Hydatid Cyst Fluid of *Ecchinococcus Granulosus* Isolated from Infected Human, Sheep, Goats and Cattle in Duhok City, Kurdistan Region of Iraq

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Abstract—This study included comparative biochemical contents of hydatid cyst fluid of *Ecchinococcus granulosus* isolated from infected human, sheep, goats and cattle in Duhok city/ Kurdistan Region of Iraq. With respect to biochemical profile of hydatid cyst fluid of *Ecchinococcus granulosus*, the following chemical substances in cystic fluid of hydatid cyst isolated from infected human, sheep, goats and cattle were measured namely: Sodium, Potassium, Calcium, Glucose, Cholesterol and Triglycerides. The level of all these substances were slightly in quantitative variations, but statistically, these results revealed that there is no significant differences.

Keywords— Hydatidosis, *Echinococcus granulosus*, hydatid cyst, Echinococcosis.

I. INTRODUCTION

HYDATIDOSIS/Echinococcosis an important zoonosis caused by metacestode of the dog worm *Echinococcus granulosus*, is worldwide in distribution with both sylvatic and pastoral epidemiology [27]; [9]; [19]; [24]; [15]. The parasite has an indirect life cycle utilizing dogs and other canids as definitive hosts and many herbivorous and omnivorous species, including wildlife and domesticated livestock as intermediate hosts. Mature *Echinococcus* (2-11mm in length) produce eggs that are shed in the faeces. When eggs released from the definitive host, they contain in fully developed larval stage, the oncosphere, which is infective to a susceptible intermediate host. After ingestion of eggs, the oncosphere hatch in the upper gastro-intestinal tract become activated, penetrate the mucosa and migrate to the visceral organs and gradually develop into hydatid cyst. Scoleces are generated within cysts from the inner germinal layer. Life cycle is completed when the definitive host eats an infected intermediate host organ, human exposure is by faecal-oral way, with water or food contaminated by faeces of infected definitive host [23]. However *E. granulosus*, is the most prevalent species in all continents, causing considerable public

health problems in many regions of the world [26]. Furthermore, it is also common in Iraq [16] and [20], including Kurdistan region [14] [2]. Epidemiological situation for this parasite is complicated by the fact that several strains have been identified in most area where infection is endemic. These strains exhibit different degrees of infectivity for certain intermediate hosts. Previously, strains were identified using morphological, biological, biochemical and some other criteria. However, in recent years molecular techniques have contributed in more precise strain identification at the DNA level [22]. Biochemical studies are useful in differentiating strain variations of *E. granulosus* in different countries [10]; [11]; [4]. The strain characterization is particularly important in regions where more than one species of livestock intermediate host exists and where there is the possibility of different cycles of transmission and sources of infection for humans [22]. Biochemical studies on hydatid cysts from different host origins can help for information for determination of strains of *E. granulosus*. The present study is designed to study the some biochemical profiles of hydatid cyst fluids from different hosts (sheep, goats, cattle) for identification of strain variations of *E. granulosus*.

II. MATERIALS AND METHODS

This study includes a biochemical study, the samples were collected from the modern Duhok abattoir. For this study hydatid cysts of *E. granulosus* were collected randomly from infected organs of animal (sheep, goats and Cattle). The collected samples were kept in cool box containing crushed ice and transferred to the laboratory for biochemical studies. In addition, 4 hydatid cyst fluids of humans during surgical removal of cysts from patients at Azadi Teaching Hospital in Duhok city. The hydatid cyst fluid was collected in disposable plastic tubes. Biochemical studies were carried out on Hydatid cyst fluid, Hydatid cyst fluids was taken in a special test tubes (5-8 mL), separated by centrifugation at 4000 rpm using centrifuge for 30 minutes and stored in deep freezer (Lab tech - Italy) at -40°C until used [26], [2]. Biochemical analysis. Glucose, triglycerides, cholesterol, calcium, sodium,

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potassium were estimated by a diagnostic Kit and Auto Analyzer Spectrophotometer.

III. RESULTS

The biochemical profile of hydatid cyst fluid of *Echinococcus granulosus*, from human and some other intermediate host (Sheep, Goats, Cattle) are shown in following table (tab.I).

TABLE I
BIOCHEMICAL PROFILES OF HYDATID CYST FLUIDS

Biochemical Profiles	Cattle M ± SEM	Goat M ± SEM	Sheep M ± SEM	Human M ± SEM
Sodium (mmolL ⁻¹)	134.2 ± 2.05 (N= 5)	138.2 ± 2.31 (N= 5)	139.6 ± 4.29 (N= 5)	143.8 ± 2.85 (N= 4)
Potassium (mmolL ⁻¹)	3.82 ± 0.69 (N= 5)	3.88 ± 0.77 (N= 5)	4.36 ± 1.03 (N= 5)	4.44 ± 0.66 (N= 4)
Calcium (mmolL ⁻¹)	3.84 ± 0.53 (N= 5)	4.34 ± 0.69 (N= 5)	3.36 ± 0.67 (N= 5)	3.58 ± 0.48 (N= 4)
Glucose (mmolL ⁻¹)	4.02 ± 0.81 (N= 5)	3.3 ± 0.59 (N= 5)	3.38 ± 0.70 (N= 5)	1.6 ± 0.24 (N= 4)
Cholesterol (mmolL ⁻¹)	0.368 ± 0.15 (N= 5)	0.364 ± 0.15 (N= 5)	0.344 ± 0.14 (N= 5)	0.146 ± 0.01 (N= 4)
Triglycerides (mmolL ⁻¹)	0.068 ± 0.01 (N= 5)	0.046 ± 0.01 (N= 5)	0.036 ± 0.008 (N= 5)	0.052 ± 0.004 (N= 4)

IV. DISCUSSION

Chemical substances in hydatid cyst fluid of *Echinococcus granulosus* have important role in metabolism and immunological functions of parasite [22]; [10]. The different strains of *Echinococcus granulosus* Have different composition of biochemical substances and also these strains have variation in there metabolic function. [10]; [22]; [4]. Biochemical analysis of hydatid cyst fluid of *Echinococcus granulosus* from different hosts can help to obtain the good information for identification of different strains of *Echinococcus granulosus* [5]. Analysis of biochemical substances in hydatid cyst fluid of *Echinococcus granulosus* Was done by many researchers [6] ; [5] ; [3]. Macpherson and McManus, 1982 was found, glucose, urea, and sodium in hydatid cyst fluid of *Echinococcus granulosus* isolated from liver. Sharif *et al.* (2004) were found significant differences of potassium, creatinine, calcium, triglyceride, cholesterol, uric acid, albumin, Phosphokinase gamma glutamyl transferase, aspartate, aminotransferase and creatinine in hydatid cyst fluid of *Echinococcus granulosus*. Rahdar *et al.*

(2008) investigated significant differences in Ca, P, Mg, Na and K, during analysis hydatid cyst fluid of *Echinococcus granulosus*. In present study, we compared some biochemical substance of hydatid cyst fluids of *Echinococcus granulosus* in humans and some other intermediate hosts (sheep, goats, cattle) this biochemical comparison may can help in the characterization and identification of strain of *E. granulosus* in our region. The biochemical content of hydatid cyst fluid of *E. granulosus*, shown in Table (1). It is obvious from the results that, the Sodium and Potassium content of hydatid cysts fluid isolated from human was higher than Sodium and Potassium content of hydatid cyst fluids of other intermediate host (143.8 ± 2.85), while Sodium and Potassium content of hydatid fluid of cattle was lower than other intermediate host. The same result was observed research of [18]. Also Sodium and Potassium content of hydatid cyst fluid of sheep was slightly higher as compared with Sodium and Potassium of hydatid cyst fluid of goats. Statistical analysis of these results revealed that there is no significant differences between hydatid cyst fluids of these intermediate hosts. From the results of this study It is clear that calcium level of hydatid cyst fluid isolated from goats was higher as compare with other inter mediate host hydatid cyst fluid, and the level of calcium in hydatid cyst fluid of sheep was lowest. In the research of [1] and [18]. was shown the same results. From the present study obvious that the concentration of Glucose and Cholesterol was shown in the highest level in hydatid cyst fluid isolated from cattle and lowest level in human hydatid cyst fluid. The glucose content of sheep was shown higher than that of goats and the cholesterol content of sheep was shown lower than that of goats. Also in the present study was shown that the level of Triglycerides content of hydatid cyst fluid of cattle was higher than other intermediate host hydatid cyst fluid, and the Triglycerides content of hydatid cyst fluid of sheep was lowest as compare with other intermediate host. Triglycerides content of hydatid cyst fluid isolated from human was shown higher than that of hydatid cyst fluid of goats. Many workers reported the same results of biochemical content of hydatid cyst fluid of *Echinococcus granulosus*, isolated from different intermediate host for example [8], carried out a comprehensive study on hydatid cyst fluid from human, sheep and cattle, they reported the presence of Sodium, potassium, glucose and some other biochemical profil of hydatid cyst fluid. Frayha and Haddad (1980) reported the presence of Calcium and Sodium in hydatid fluid. Al-Ubeidi (2005), during his study in Mosul city recorded some chemical composition such as total protein and glucose in sheep hydatid cyst fluid. Meerkhan 2011, found the same results of biochemical substances of hydatid cyst fluid of human and other intermediate host. Statistical analysis of these results revealed that there is no significant differences between biochemical chemical profile of hydatid cyst fluids of these intermediate hosts.

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