

Comparative analytical study between parent and daughter hydatid cysts fluids Isolated from sheep in Iraq

Amal Khudair Khalaf
Department of Microbiology
College of medicine\ University
of Thi-Qar\ Iraq
amal-khalaf@utq.edu.iq
amalkhudair111@gmail.com

Afrah Abid Maktoof
Department of biology,
collage of science\ University of
Thi-Qar\ Iraq
Email: afrah.m_bio@sci.utq.edu.iq

Abstract: The importance of the study the chemical composition from trace elements in hydatid cyst fluids was coming from the distribution of this infection in Iraq yearly, this is lead to deal with the study of the disease widely. So, the present study was designed to detect some electrolytes in both of parent and daughter hydatid cysts by atomic absorption spectroscopy where it is found the presence of (Pb, P, Cd, K, Na, Mn, Cu, Fe, Ca, Mg, Zn) in both of the parent and daughter hydatid cysts recording Pb (80.93), P(30.17), Cd(28.73), K(50.23), Na(62.88), Mn(591.66), Cu(405.92), Fe(317.42), Ca(200.21), Mg(178.32), and Zn(151.56) µg/ml in contents of the parent hydatid cyst while the contents of these metals in the daughter hydatid cyst are Pb (61.12), P(22.11), Cd(20.82), K(36.29), Na(54.62), Mn(300.22), Cu(291.42), Fe(101.41), Ca(83.12), Mg(98.81), and Zn(76.58) µg/ml respectively.

Key words: Parent hydatid cyst, daughter hydatid cyst, Trace elements.

I. INTRODUCTION

Many terms are used to describe the infection with hydatid cyst like hydatidosis and echinococcosis by the old scientists which it has a unilocular shape. The old Arabic man or traders describe the infection with the hydatid cyst as 'al atash' as well as Al - akyas al-mai'yah'. (Dar and Alkarami, 1997) hydatid disease is caused by the cyclophilidian cestoda species called *Echinococcus granulosus* (Akhan *et al.*, 2002 and Georgopoulos *et al.*, 2007).

The shape of hydatid cyst is spherical and unicellular, it is filled with fluid (Eckert *et al.*, 2001). The completely developed hydatid cyst is triple, the outer layer is derived from fibrous

tissue of the target organ so it is called pericyst; while the second layer included the exocyst or a cellular laminated layer and the endocyst or the germinal layer of the parasite (Taherkhani and Rogan, 2000). Brood capsule is initiated by internal budding through the germinal layer and also is called the secondary cyst inside it the protoscolices are formed and take about year to develop after infection. If large, the intact hydatid cyst is fully filled with fluid. Hydatid sand is the basic contents of fluids and included scolices as well as hooklets (King *et al.*, 2000; Karyakarti and Damle, 2004).

Echinococcosis symptoms depend on the number, measurement and the site of metacestodes. The cysts when become large sufficient, damage thereabout organs and tissues, they are generally symptomatic. The Clinical symptoms will not take place while the cyst cleavage due to shock or affects contiguous structures. The cyst If leakage occurs that because of minor shock, allergic reactivity maybe following by urticaria and flushing, and more gravely there maybe an anaphylactic reactivity (King *et al.*, 2000; Karyakarti and Damle, 2004). Trace elements mean substantial composites of biological construction, but their concentrations beyond

needful for biological functions, can be toxic (Khalaf , 2013).So, the following study is aimed the basic electrolytes in the fluids of both parent and daughter cysts in sheep .

II. METHOD AND MATERIALS

Fresh parent and daughter hy-datid cysts were obtained from liv-er of sheep after slaughtering in Nassiriyah abattoir \ southern Iraq. It was placed in clean ice boxes and it was carried carefully, then transported to the laboratory of Parasitology in college of medicine that return to university of Thi-Qar, where the fluids have removed from both parent and daughter hy-datid cysts . 5ml of fluids were as-pired from both cysts in order to reach for the system technique or atomic spectra. In about 0.5-1 ml from parent and daughter cystic fluid was mixed with the mixture of digestion consist of nitric oxide and perchloric acid in equal vol-ume by using sterilized tube. In or-der to enhance the digestion rate , the sample was shacked for a minute and finally , it is carried to an oven at 37°C for 48 hours , then after , deionized water was used for dilution the formed mixture by 10:1 and transported to atomic spectroscopy (Mahdi et al ., 1996; Mahdi et al., 2010).



Figure (1): a): parent Hydatid cyst, b)daughter cyst

III. RESULTS

The current study were achieved on parent and daughter hydatid cysts in liver of sheep and it is found the fol-lowing metals (Pb, P ,Cd ,K ,Na ,Mn ,Cu ,Fe ,Ca ,Mg ,Zn) in both of the parent and daughter hydatid cysts re-cording Pb (80.93), P(30.17) ,Cd(28.73) ,K(50.23) ,Na(62.88) ,Mn(591.66) ,Cu(405.92) ,Fe (317.42),Ca(200.21) ,Mg(178.32) ,and Zn(151.56) µg/ml in contents of the parent hydatid cyst while the contents of these metals in the daughter hydatid cyst are Pb (61.12), P(22.11) ,Cd(20.82)

,K(36.29) ,Na(54.62) ,Mn(300.22) ,Cu(291.42) ,Fe (101.41),Ca(83.12) ,Mg(98.81) ,and Zn(76.58) µg/ml as it is listed in the following table1:

Table(1): The levels of some electrolytic in the fluids of parent and daughter cysts

Electrolytes or Trace element	Levels of fluid in parent cyst by µg/ml	Levels of fluid in daughter cyst by µg/ml
Pb	80.93	61.12
P	30.17	22.11
Cd	28.73	20.82
K	50.23	36.29
Na	62.88	54.62
Mn	591.66	300.22
Cu	405.92	291.42
Fe	317.42	101.41
Ca	200.21	83.12
Mg	178.32	98.81
Zn	151.56	76.58

IV. DISCUSSION

Hydatid cyst remains a significant public health problem in endemic areas such as Turkey, the Middle East, South America, New Zealand , Mediterranean region, Africa , China, northern Kenya, Australia, and other sheep-raising areas (Eckert et al.,2001)

The biological system is strongly required the activity of the trace elements like formation the metalloproteins by bonding of this trace elements to protein and can be part of enzymatic system . this metals have act as transported in metalloproteins by protein joining to its location found in the cell, so it has storage and structural functions (Srivastav *et al.*, 2011). Regulation of the presence of this metals the fluids of any organism is necessary since its deficiency or excess are not preferred and both can killed the organisms (Shaeffer,2006) , Because The

biological structure of organisms required the role of trace elements as essential component for it, in condition, if it found at high levels more than of its necessary it will be toxic and may killed the organism(De Oliveira *et al.*, 2001; Fraga,2005) .

This study is nearly similar to that achieved on the other parasites by recording the same metal in the structure of these organism like *Gastrodiscooides hominis*, *Fischoederius cobboldi*, *Gastrothylax crumenifer*, *Orthocoelium* ,*Fasciolopsis buski* , and *Fischoederius elongates* (Srivastav *et al.*, 2011 ; Khalaf and kadeem, 2016) .

Pb , P,K, Cd, and Na, metals were the lowest among the other metals in each parent and daughter hydatid cyst fluid , further , there some differences in its concentration between the parent and daughter hydatid cysts fluids. The presence of these metals in the fluids or the structure is necessary for the biological function of these hydatid cysts for example, they are necessary for the nucleic acids structure and metabolism. The importance of Cd and Pb is by the activity of them on the systems of the body's organ , like immune, the cardiovascular , reproductive systems, the nervous system, bones, and the kidneys (De Oliveira *et al.*, 2001; Srivastav *et al.*, 2011) but Cd is known to be accumulate accumulate and also it is very toxic as affects the reproductive organs.

Mn, Cu, Fe, Ca, Mg, and Zn also present in high amount in the fluids of both parent and daughter cysts but with some differences in concentration like Ca is high in parent cyst but it is low in daughter cyst. The same metal were also reported on other parasites like *Gastrodiscooides hominis*, *Fischoederius cobboldi*, *Gastrothylax crumenifer*, *Orthocoelium* ,*Fasciolopsis buski* , and *Fischoederius elongates* (Fraga,2005; Srivastav *et al.*, 2011). Manganese is essential trace nutrient like the synthesis of glycoproteins, polysaccharides and sterol .the biological system is also required the presence of Mg with Mn since Mg is essential for the shape of the cell during

cleavage and for the surface of the cells as changes for ionic bridging (Ozen *et al.*, 2009 ; Swadi and Khalaf 2022).

Many functions for life is achieved by this metal when it present like the mRNA synthesis is increased by the availability of Zn in cell (Srivastav *et al.*, 2011) leading to the enzymes availability for synthesis of DNA and RNA transcription from DNA (Fraga,2005) . Iron was found in the intestinal cells of many helminthes as inorganic deposits for cataclysm or cofactors(Fraga,2005), it is also present in the fluids for both parent and daughter hydatid cysts in this study . reductant in the cytochrome oxidase, the enzymes superoxide dismutase, and reduction of molecular oxygen by oxidases that functions were achieved by the presence of Ca, Cu, K, and Na (Aggett,1994 ; Ozen *et al.*, 2009;Srivastav *et al.*, 2011, Khalaf and Swadi 2019).

REFERENCES

1. Akhan , O. ; Ensari , S. and Ozmen, M. (2002) . Precutaneous treatment of a period gland hydatid cyst . Eur. Radiol. , 12: 597-599.
2. Aggett, P.J. (1994). Aspects of neonatal metabolism of trace metals. Acta Paediatrica Supp, 402: 75-82.
3. Dar, F.K. and Alkarmi ,T. (1997). Public health aspects of cystic echinococcosis in the Arab countries. Acta. Tropica. 67 : 125-132.
4. De Oliveira, F.S.; Viana, M.R. and Antonio, A.R. (2001). Differential effect of lead and zinc on inhibitory avoidance learning in mice. Braz J Med Biol Res 34:117-120.
5. Eckert , J . ; Deplazes , P . and Craig , P. (2001) . Echinococcosis in animals : clinical aspects ,diagnosis and treatment .In:Eckert ,J.Gemmell, M.Meslin

- ,F.X.Pawlowski, Z.eds.WHO/OIE manual on echinococcosis in humans and animals: a public health problem of global concern. Paris: W.O.A.H. 72-99.
6. Fraga CG. (2005). Relevance, essentiality and toxicity of trace elements in human health. *Mol Aspects Med.* 2005; 26(4-5): 235-24..
 7. Georgopoulos, S.; Korres, S.; Riga, M. and Ferekidis, E. (2007). Hydatid cyst in the bile duct of the submandibular gland. *Int. J. Oral. Surg.*, 36: 177 – 179.
 8. Karyakarte, R. and Damle, A. (2004). *Medical Parasitology*. Arunabha Sen, Books and Allied (P)LTD, 8/1 Chintamani Das Lane, Kolkata.
 9. King, C. Cestodes, Mandel, GL, Bennet JE, and Dolin R (eds). (2000) *Principles and practice of Infectious diseases 4th edn* Churchill & Livingstone, pp 2957- 2965.
 10. Khalaf, A.Kh. and Saadi, B.F(2019). Estimation of the some trace element in the fluid of cysticercus fasciolaris larva of Taenia taeniaformis. *Biochemical and cellular archives*, 19(2), pp. 3801-3803.
 11. Khalaf, A.Kh. and Kadeem, M.K(2016). Levels of Trace Elements in Hydatid Cyst Fluid: Analytical Study. *Thi-Qar Medical Journal (TQMJ)*: Vol.(12), No.(2).
 12. Khalaf, A.Kh. (2013). Zinc toxicity associated with hydatid cyst infection among patients in Nasseriyah city \ Thi-Qar province, south Iraq. *Thi-Qar Medical Journal (TQMJ)*.7(2).
 13. Mahdi, J.; Mohammad H. Al-Jawher; and Mahdi, N. K. (2010). Zinc and copper levels in hydatid cyst fluid and patient's blood. *J. Pak. Med. Assoc.* 60 (7) : 580-581.
 14. Mahdi NK, Al_Baldawi, F.A. and Benyan, A.K. (1996). Immunoglobulin levels in sera and cyst fluid of human hydatidosis. *Med. J. Basrah Univ.*, 14: 91-9.
 15. N, Celik C, Ozkan K, Malazgirt Z, Isimer A, Sayal A. (2009) Trace elements in hydatid disease. *J Trace Elem Electrolytes Health Dis* 1992; 6: 67-70.
 16. Shaeffer, G.L. (2006). Evaluation of basic zinc chloride as a zinc source for cattle. M.Sc thesis in North Carolina State University. Animal Science. Raleigh.
 17. Srivastav, S. K.; Murti, R. C. And Gupta Vinod, C. (2011). Quantitative Analysis of Trace Elements In *Fasciolopsis buski* and *Gastrodiscoides hominis* *IJCPR*; 2(3):161-168.
 18. Swadi BF. and Khalaf A.Kh.(2022). Chemical study for hydatid cyst of lung isolated from patient with hydatidosis. *Chines journal of medical genetic*. 32(4):1003-9406.
 19. Tandon, V. and Ray, B. (1994). Analysis of trace element of some edible trematodes parasitizing the bovine hosts. *C. Science*; 67(7): 548-468.
 20. Taherkhani, H. and Rogan, M. T. (2000). General characterization of Laminated layer of *Echinococcus granulosus*. *Iran. J. Med. Sci.*, 25 : 95-104.