Comparative Biochemical Analysis of Hydatid Fluid from Ovine Lungs and Livers

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Abstract

The present study was conducted for the comparative quantitative analysis of hydatid cyst fluid for the presence of glucose, total protein, triglycerides, calcium, potassium, chloride and sodium, from ovine lungs and livers collected from local abattoirs. The study revealed that mean values of glucose, total protein, and sodium were significantly (P<0.01) higher in cysts from lungs (46.81±0.84 mg/dl; 26.30±0.46 mg/dl; 113.64±0.72 mmol/L) when compared with those from liver (35.64±0.42 mg/dl; 21.14±0.32 mg/dl; 107.92±0.59 mmol/L). However, the mean values of calcium, potassium and chloride were significantly (P<0.01) higher in cysts from liver (24.94±0.38 mmol/L; 6.17±0.074 mmol/L; 124.22±0.96 mmol/L) when compared with those from lungs (22.51±0.22 mmol/L; 5.42±0.048 mmol/L; 104.47±0.54 mmol/L). The mean triglycerides levels in cysts from lungs (2.76±0.039 mg/dl) were significantly lower than those from liver (2.90±0.036 mg/dl). The study reflected that the difference in the fluid composition of liver and lung hydatid cysts is significantly influenced by the metabolic and biochemical status of the organ involved as well as protoscolex contents.

Key words: hydatid fluid, hydatidosis, biochemistry, ovine.

Introduction

Hydatidosis is a term used to describe the infection of animals and man with metacestode stage of Echinococcus species, a dog tapeworm, Eckert and Deplazes (2004); Parija (2004). Hydatidosis in animals is a major economic problem and concerns the growth delay, the qualitative and quantitative production of meat, milk, wool, the fall in fertility as well as the condemnation of viscera at slaughter, Torgerson (2003). The disease has been recognized as one of the most important parasitic problems in man and livestock worldwide, Singh et al (1988), resulting in significant economic losses in livestock as well as human complicacies. The cyst fluid contains biochemical substances such as carbohydrates,
proteins, lipids, vitamins, electrolytes and trace elements that may have role in the metabolism and growth of hydatid cyst, Farayha and Smyth (1983), Amanvermez et al (1995). Therefore, the present study was designed to evaluate the biochemical profile of hydatid cyst fluid from livers and lungs of sheep.

**Materials and Methods**

Organs infected with hydatid cysts (lungs and livers) were collected from the indigenous sheep slaughtered in local abattoirs. Approximately, 5ml of the hydatid fluid was taken from the cystic lungs and livers. A total of 50 samples each from livers and lungs were collected. The fluid was centrifuged and the supernatant was analysed for glucose, total protein, triglycerides using an autoanalyser (I Lab 600 biochemistry autoanalyser USA). The electrolytes (sodium, potassium, calcium and chloride) were estimated using an autoanalyser (Roche AVL 9180, Roche diagnostics/I Lab 600 biochemistry autoanalyser USA). The student’s t test was used for the statistical analysis. The data obtained was statistically assessed by student’s t test using the General Linear Model procedure of Statistical Package for the Social Sciences, Base 10.0, 1999 (SPSS Software products, Marketing Department, SPSS Inc. Chicago, USA).

**Results and Discussion**

The biochemical analysis of hydatid fluids revealed significantly (P<0.01) higher values of mean glucose, total protein, and sodium in cysts from lungs (46.81±0.84 mg/dl; 26.30±0.46 mg/dl; 113.64±0.72 mmol/L) when compared with those from liver (35.64±0.42 mg/dl; 21.14±0.32 mg/dl; 107.92±0.59 mmol/L). However, the mean values of calcium, potassium and chloride were significantly (p<0.01) higher in cysts from liver (24.94±0.38 mmol/L; 6.17±0.074 mmol/L; 124.22±0.96 mmol/L) when compared with those from lungs (22.51±0.22 mmol/L; 5.42±0.048 mmol/L; 104.47±0.54 mmol/L). The mean triglyceride levels were significantly (p<0.05) lower in cysts from lungs (2.76±0.039 mg/dl) when compared with those from liver (2.90±0.036 mg/dl) (Table 1).

**Table 1- Biochemical analysis of fluid from hydatid cyst of sheep lungs and livers (mean±S.E).**

<table>
<thead>
<tr>
<th>Biochemical parameters</th>
<th>Lungs (n=50)</th>
<th>Livers (n=50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glucose (mg/dl)</td>
<td>46.81±0.84*</td>
<td>35.64±0.42*</td>
</tr>
<tr>
<td>Triglyceride (mg/dl)</td>
<td>2.76±0.039**</td>
<td>2.90±0.036**</td>
</tr>
<tr>
<td>Total protein (mg/dl)</td>
<td>26.30±0.46*</td>
<td>21.14±0.32*</td>
</tr>
<tr>
<td>Calcium (mmol/L)</td>
<td>22.51±0.22*</td>
<td>24.94±0.38*</td>
</tr>
<tr>
<td>Sodium (mmol/L)</td>
<td>113.64±0.72*</td>
<td>107.92±0.59*</td>
</tr>
<tr>
<td>Potassium (mmol/L)</td>
<td>5.42±0.048*</td>
<td>6.17±0.074*</td>
</tr>
<tr>
<td>Chloride (mmol/L)</td>
<td>104.47±0.54*</td>
<td>124.22±0.96*</td>
</tr>
</tbody>
</table>

*significant at 1% level (p < 0.01); **significant at 5% level (p > 0.05)
Many studies have been conducted regarding the biochemical analysis of hydatid cyst fluid in man and animals, McManus (1981); Macpherson and McManus (1982); Çelik (1989). These biochemical substances within hydatid cysts play a definitive role in the metabolism, physiology and immunology of cystic echinococcosis, Thompson and Lymbery (1995); Shaafie et al (1999). The differences observed in the present study for various biochemical constituents in cysts from lung and liver, are in agreement with findings of Refik et al (2002). Researchers have also reported a wide variation in concentrations of ions and other chemical constituents in the hydatid cyst fluid of the sheep, Farayha and Smyth (1983). This reflects that the tissue metabolism, protoscolex contents and biochemical status of the organ involved might be actively modulating the composition of cyst fluid and thus bringing about the differences in the biochemical composition of hydatid fluid from different organs. Differential active transport of some electrolytes across the cyst wall in different organs has already been reported by Anwar (1997). This could have a bearing on cyst development and fertility.

References


