

ULTRASONOGRAPHIC APPEARANCE OF HYDATIC LIVER IN CHILDREN*

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Echinococcus granulosus is a tapeworm that infects man as intermediate host. The disease is found most commonly in Australia, South America, Asia and the Middle East¹⁻³. Cysts are found most commonly in the liver and the lungs. In those parts of the world where echinococcal cysts are endemic they comprise the large majority of liver masses presenting for evaluation. Hydatid disease is seen quite frequently among the adult population in rural areas of Turkey. As for the children, there is an increasing incidence of hydatid liver.

Since ultrasound examination is easy, noninvasive and involves no radiation, it is now considered to be one of the best diagnostic methods in the investigation of hepatic masses. Since there have been no large scale studies in which hepatic hydatid cysts in children have been evaluated by means of ultrasound, we thought it would be useful to present our experience with real-time gray-scale ultrasound evaluation in 15 surgically proven cases.

Material and Methods

The ultrasound examination was performed with a real-time gray-scale B scanner, using probes 4 MHz (PLB 308M SAL-20 Toshiba). Fifteen patients were included in this study. Their ages ranged from 8 to 17 years; there were eight boys and seven girls. Cysts were located within the right lobe of the liver in 11 cases; and only in four cases were they located in the left lobe. In two cases, both lobes of the liver were affected. Multiple cysts were detected in six cases. All of these cases have been confirmed surgically as having liver hydatid disease.

Results

The analysis of the echograms obtained in our 15 cases have enabled us to classify the hydatid cysts into three groups.

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Group 1. This group of cysts appear as an anechoic space with marked enhancement of back-wall echoes. It shows clearly defined borders and it is round or spherical in shape. Thirteen of our 15 cases demonstrated this ultrasound pattern which is also called the simple hydatid cyst (Figure 1). Most of the cysts which were classified in this group, demonstrated very thin walls. An echo-dense inner-layer, which represents the undisturbed germinative membrane of the cyst, was detected in only a few cases in this group (Figure 2). When these cysts were aspirated during surgery a clear fluid was obtained.

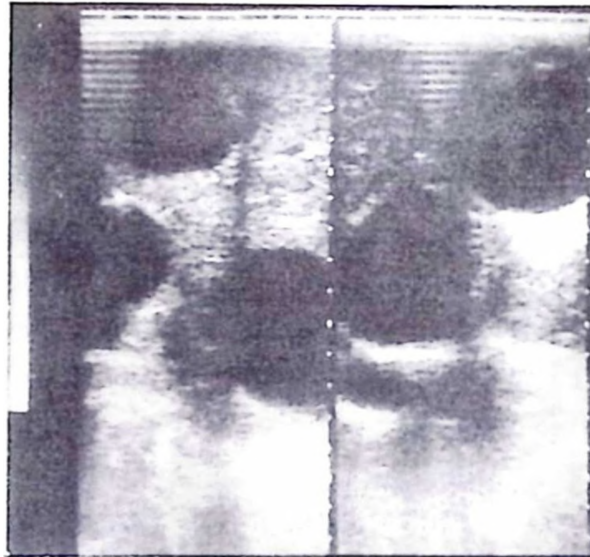


Figure 1

Simple hydatid cysts, with very thin walls, in the liver (group 1).

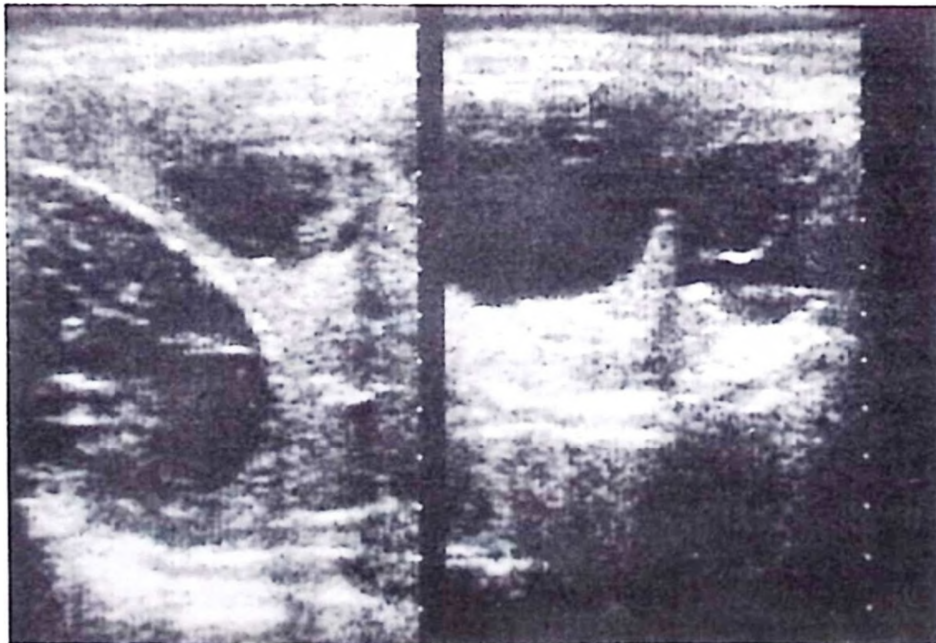


Figure 2

**Multiple simple hydatid cysts (group 1).
One of the cysts shows echo-dense
inner-layer representing germinative membrane.**

Group 2. A hydatid cyst with intracystic septation was detected in only one of our 15 cases. In this group, the fluid collection retains its well-defined contour, but it is divided by septa which are thick and form oval-shaped or rounded structures. The enhancement of back-wall echoes is also present (Figure 3).

Group 3. This group of cysts exhibit ill-defined borders with a hypoechoic appearance or a hypoechoic solid pattern or both. This pattern usually indicates infection of the hydatid cyst. One of our 15 cases was in this group and an infected hydatid cyst was confirmed at surgery (Figure 4).



Figure 3

Hydatid cyst with intracystic septation (group 2).

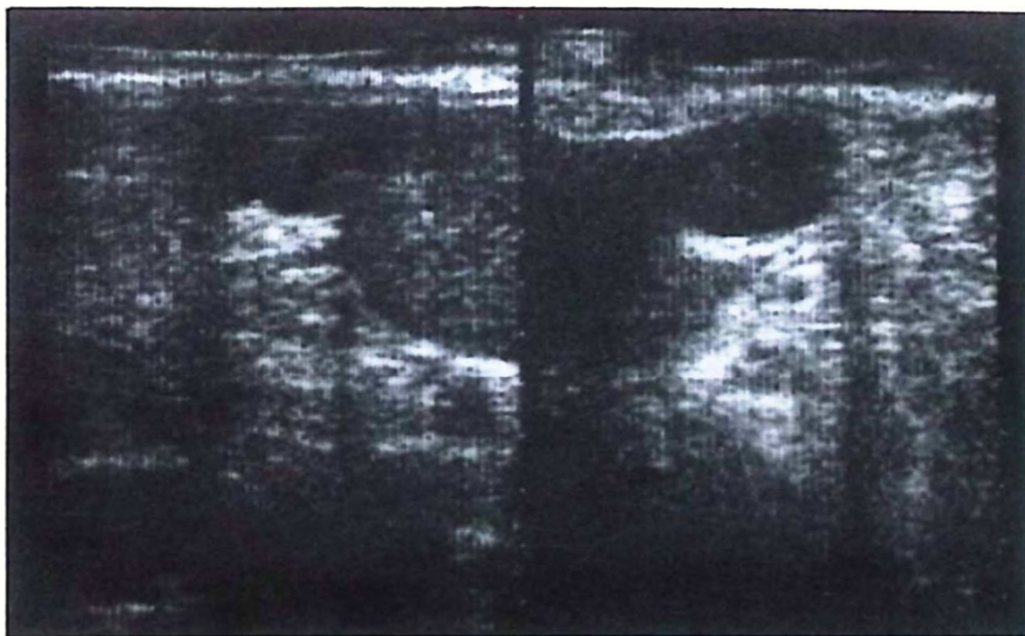


Figure 4

Hydatid cyst in liver with heterogeneous echo pattern (group 3).

Discussion

Our series of 15 cases clearly shows that group 1 or the simple hydatidic cysts are far more common than groups 2 and 3. The appearance of the simple hydatidic cysts as seen in adults shows some features which are not present in those of children. According to Özkan et al⁴, the presence of a double layer surrounding the cyst is accepted as characteristic of hydatidic disease in adults. They also indicate that if a double layer is not demonstrated, differential diagnosis between hydatidic cyst and polycystic disease, based on ultrasound features, is not always easy⁵⁻⁸. In our series, we were unable to detect a double layer in group 1 cases. In one case in group 1, an echo-dense layer, at the periphery of the cyst and indicating germinative membrane is another typical feature for the diagnosis of hydatidic cyst in adults. Again we were unable in our 15 cases, to detect any collapsed germinative membrane, which displays itself as an echo-dense area in the center of the cyst. The absence of these classical findings in hydatidic cysts in children causes great difficulty in diagnosis.

In group 2 cysts, the presence of septa in the cyst is helpful in making the diagnosis of hydatidic disease^{5,9}. In our series, this pattern was demonstrated in only one case. It has generally been accepted that this appearance is due to the presence of daughter cysts within the hydatidic cyst^{5,10}. In view of our results, it seems that there are fewer daughter cysts in the hydatidic cysts of the pediatric age group. This phenomenon was also confirmed by surgery.

The cysts in group 3 exhibit ill-defined borders with a hypo- or hyperechoic pattern or both. It is visualized as a solid pseudo-tumor which is difficult to diagnose unless group 1, simple hydatidic cysts, are seen elsewhere within the liver.

In our series, the ultrasound examination of one case showed this pattern. Secondary infection of hydatidic cysts should be suspected if group 3 cysts are diagnosed pre-operatively as in our one case. At surgery, secondary infection was confirmed. In our series, the number of cases which are classified in group 3 appears to be very low when compared to the adult series reported by other investigators^{2,4,8}. On the basis of this observation, the occurrence of secondary infection of the hydatidic cysts in the pediatric age group might be thought to be less than otherwise expected.

In conclusion, in our experience, the great majority of hydatidic cysts seen in children would seem to be simple hydatidic cysts without centrally located, echo-dense germinative membrane and intracystic septation. In addition, it seems that hydatidic cysts with a heterogeneous echo pattern indicating secondary infection are quite rare.

Summary

A clinical study of 15 cases of hydatid cysts in children, diagnosed by means of a real-time gray-scale B-scanner is presented. It was subsequently confirmed surgically that there were hydatid cysts in the liver in all these cases. The ultrasound features of the hydatid cysts in the children were evaluated and we concluded that the great majority of hydatid cysts seen in children are simple hydatid cysts. Other features of hydatid disease such as hydatid cyst with septa and hydatid cyst with heterogeneous echo pattern, were found to be very rare in the pediatric age group.

REFERENCES

1. Babcock DS, Kaufman L, Cosnow I. Ultrasound diagnosis of hydatid disease (echinococcosis) in two cases. *Am J Roentgenol* 131:895, 1978.
2. Gharbi HA, Hassine W, Brauner MW, Dupuch K. Ultrasound examination of the hydatid liver. *Radiology* 139:459, 1981.
3. Alltree M. Scanning in hydatid disease. *Clin Radiol* 30:691, 1979.
4. Özkan K, Gürses N, Sungur R. Ultrasound diagnosis of the hydatid liver. *Hacettepe Med J* 19:April 1986 (in press).
5. King DL. Ultrasonography of echinococcal cysts. *J Clin Ultrasound* 1:64, 1973.
6. Weaver RM, Goldstein HM, Green B, Perkins C. Gray scale ultrasound imaging. *Radiology* 119:415, 1976.
7. Wooten WB, Green B, Goldstein HM. Ultrasonography of necrotic hepatic metastases. *Radiology* 128:447, 1978.
8. Spiegel RM, King DL, Green WM. Ultrasonography of primary cyst of the liver. *Am J Roentgenol* 131:235, 1978.
9. Niron EA, Ozer H. Ultrasound appearance of liver hydatid disease. *Br J Radiol* 54:335, 1981.
10. Belding DL. Echinococcus granulosis. *Textbook of Parasitology*. New York: Appleton-Century-Crofts, 1978, pp 626-643.