STUDY OF 4,850 OPERATED HYDATIDOSIS CASES IN IRAN

N Nourjah, GH Sahba, M Baniardalani and AR Chavshin

School of Public Health and Institute of Health Research, Tehran University of Medical Sciences, Tehran, Iran

Abstract. The present study was carried out on different aspects of echinococcosis. In this study, a retrospective survey was undertaken to determine the incidence of hydatidosis among patients hospitalized in Iran during the period 20 March 1986 to 20 March 1990 (5 years). All files of patients with hydatid cysts in all government public hospitals of Iran were reviewed. In all, 4,850 files of patients with hydatid disease were studied during this period. The disease occurs throughout Iran, but disease incidence varies in different geographical areas. The highest incidence was 4.45 per 100,000 persons in Khorasan Province. Among the 1,779 operated cases, 43.6% were from rural areas and 56.4% from urban. Women were more infected (56.4%) than men (43.6%). Cysts were localized in the lung in 46.2% and in the liver 42%. The surgical mortality rate was 1.75%. The mean operating time was 166 minutes. The mean number of hospitalization days was 37 days. Fifty-five percent had only one cyst and the rest had more than one cyst. Some patients underwent surgery five times for hydatid cysts.

INTRODUCTION

Hydatidosis is a serious worldwide disease of man caused mainly by *Echinococcus granulosus*. It was first described in the Talmud as bladders full of water (Saidi, 1976). The final and main host of the parasite are the dog and other wild carnivors, such as the wolf. The intermediate hosts are herbivore animals, with sheep being the main host. Humans are caught in the middle of this cycle as an intermediate host. Since dogs were first domesticated in Iran about 11,500 years ago (Wilson, 1984), it is very probable that early infection of humans started at least somewhere around this date. Rhazes made reference to the disease in the 9th century (Thamas, 1984 cited in Saidi, 1976). *Echinococcus granulosus* was reported in jackals by Saddighian (1969) in the Caspian Sea area and in dogs by Makarehchian (1955). *Echinococcus multilocularis* was reported by Mobedi in Moghan area for the first time, in 1970.

MATERIALS AND METHODS

The required information about hydatid cases was collected from government hospitals through the Ministry of Health and Medical Education. Complete information about cases operated upon in Tehran hospitals was extracted from their files, *ie*, age, sex, residence in urban or rural area where the patient used to live, organ(s) affected, number of cysts, clinical status at admission, diagnostic methods, number of re-operations, duration of operation(s), length of hospitalization, mortality, etc.

Several teams were also sent to a number of large city hospitals to go through the files of hydatid cyst operations. The information collected by these teams in other big cities of Iran were limited to age, sex, organs affected, duration of hospitalization, date of operation, mortality, and name of hospital.

The collected data were input into the Excel computer program and the necessary information analyzed.

RESULTS

Sixty-six hospitals were visited and their files were studied. A total number of 4,850 patients were operated upon in the government hospitals during the years 1986-1990. Of the 4,850 cases, 2,983 were hospitalized in Tehran and 1,583 in other provinces.

Geographical distribution and incidence

The disease was prevalent in different areas of Iran, with an overall rate of 1.45/100.000 persons. The incidence was highest in Khorasan Province (in the northeast) with a rate of 4.45/100.000 population and the lowest in Hormozgan Province with a rate of 1/100,000 population (Fig 1).

Among 2,226 operated cases, whose place of residence was identified in their medical files, 34.3% were from rural areas and 65.7% from urban areas.

Sex

The records of 3,297 operated cases showed that 1,858 cases were females (56.4%) and 1,439 males (43.6%).

Correspondence: N Nourjah, School of Public Health and Institute of Health Research, Tehran University of Medical Sciences, PO Box: 6446-14155 Tehran, Iran.
Tel: 0042-21-6934224; Fax: 004-21-6419924
E-mail: nourjah@hotmail.com

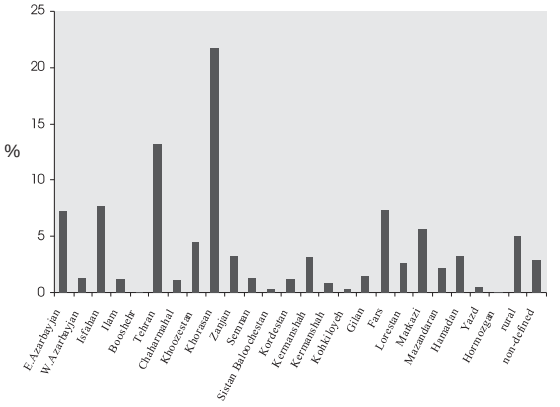

Fig 1- Geographical distribution of hydatidosis by province.

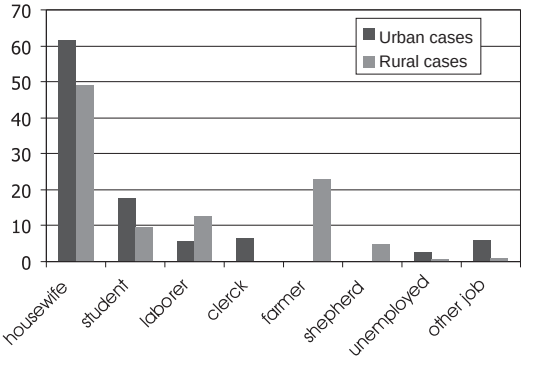

Fig 3- Occupations of patients.

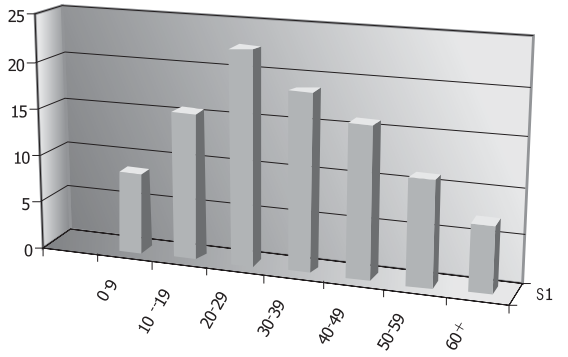

Fig 2- Age distribution of those harboring hydatid cysts.

Table 1
Educational levels of 1,227 hydatid cyst cases.

Educational level	No.	%
Illiterate	838	68.3
Primary school	231	18.8
High school	152	12.4
Tertiary	6	0.5
Total	1,227	100

Age

The age group 20-29 years had the highest rate (22.6%) (Fig 2). The youngest patient was a girl aged nine months and the oldest an 84-year-old male.

Occupation

Among 1,574 urban cases whose occupations were recorded in their files, 965 (61.3%) were housewives, 278 (17.6%) students, and 105 (6.6%) government employees. Among 954 rural cases 470 (49.2%) were housewives, 219 (22.9%) farmers, and 90 (9.4%) students (Fig 3).

Literacy

The records of 1,227 cases showed that most (838; 68.3%) were illiterate. Cases having a degree were the least (0.5%) (Table 1).

Contact with dogs

Of the 398 cases who answered the question about contact with dogs, and the response had been recorded in their files, 66.1% had contact with house dogs, sheepdogs or stray dogs, and 33.9% did not have any contact with dogs.

Number of organs infected

Of 2,199 cases with records of different organs infected, 82.9% had only one organ involved, 12.1% had two organs, and 4.9% three or more. For differences in male and female rates, see Fig 4.

Infection of different organs, by frequency

Among 2,199 operated cases of hydatidosis in Tehran, 1,142 had only one organ involved, the lung with a rate of 46.2%, liver 42%, brain 2.7%, and abdominal cavity 2.1% had the highest rates, respectively (Fig 5). The liver was the first and most organ involved among multi-organ infections.

Number of cysts per patient

Files of the 1,365 operated cases with records of the number of the cysts showed that 54.8% had only

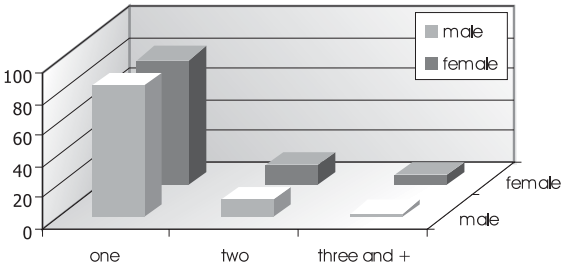

Fig 4- Comparison of numbers of organs infected with hydatid cysts, by sex.

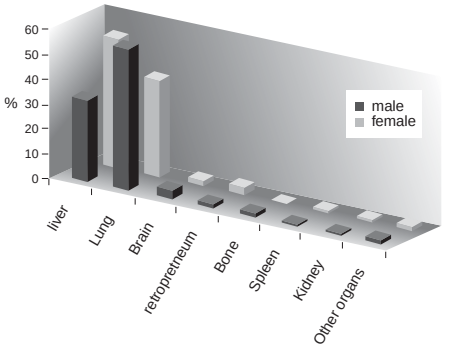

Fig 5- Infected organs, by sex.

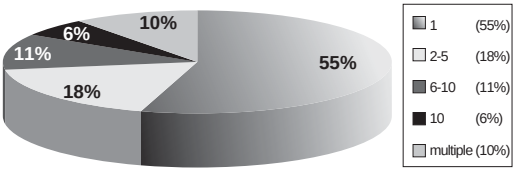

Fig 6- Number of cysts per patient.

one cyst, 18% 2-5, 11.4% 6-10, and 5.9% had > 10 cysts. Ten percent of the cases were recorded as multiple cysts (2 to numerous) (Fig 6).

Types of cysts

Among 3,370 cases operated upon, only 13 were recorded as multilocularis cysts and the rest were *E. granulosus*.

Patients' cyst status

In the files of 1,066 cases, cyst status was recorded as un-ruptured 79.2%, ruptured before surgery 6.2%, and ruptured during surgery 14.6%.

Duration of operation

Among 815 patients whose operation times were recorded in their files, the mean operation time was 166 minutes; range 50-420 minutes.

Duration of hospitalization

The mean duration of hospitalization among 1,497 cases was 37 days; range 7-235 days.

Number of operations per patient

Of 1,503 cases with recorded surgery numbers, 87.5% had one operation, 8.2% two, 2% three, 1.1% four, 0.9% five, and >5, 0.3%.

Mortality rate

Of 3,370 cases of hydatid cysts operated upon in the period 1986-1990, 58 (1.75%) died; 31% were males and 69% females. The youngest patient who die was seven years old, and the oldest 78. Of 41 patients who died in Tehran, 22 died after the first operation, 7 after the second, 5 after the third, 4 after the fourth, 2 after the fifth, and 1 after the sixth.

Clinical sings and symptoms

Patients with lung infection. The main clinical manifestations were coughing 73.4%, sputum 74.6%, sputum and hemoptysis 53.7%, dyspnea and chest pain 41.7%, and fever 32%.

Patients with liver infection. The main feature among these patients was abdominal pain (82.3%) with 52% of the cases having pain in the right hypocondor and 14% in the epigastrium. Fifty-five percent of the patients had symptoms of vomiting 26.9%, nausea 17%, constipation and flatulence 16.6%.

DISCUSSION

The actual incidence of human hydatidosis in Iran should be higher than that reported in this study. Other cases had undergone operations in private hospitals and were not included in this report. Another reason for underestimation was the hospitalization of wounded patients from the Iran-Iraq war, which occupied most hospital beds during some years of the study. As Gemmell (1984) noted, the number of surgery patients is the 'tip of the iceberg.' Some approaches, such as echotomographic and serologic screening, may pick up 43-130 times more cases, as in Tunisia (Mika *et al,* 1986), or 50 times, as in Kenya (Nelson, 1986).

Khorasan, located in the northeastern part of Iran had the highest incidence rate, but the reason is not clear. A higher rate of surgery was found among urban than rural residents. The lack of access to large city hospitals with good diagnostic and surgery facilities

for rural people, and their immigration to urban areas after infection, may be one explanation. Tavakoli-Zadeh (1974) found that of 60% of the cases operated upon were from rural areas, with 10% of them being shepherds.

The present study shows that women underwent surgery more often than men, and that housewives had the highest rate of surgery. The high rates for women and housewives might be due to sweeping their yards, where the dust contains *E. granulosus* eggs from dogs in rural areas, and cleaning and eating raw vegetables in urban situations. Shamsafar (1968), Azizi (1968, 1973), and Tavakoli-Zadeh (1974) recorded higher rates for this group in their studies in Iran. The infection rate among Turkana tribe women was 2.5 times higher than for men (Macpherson, 1983).

In sheep raising areas of California, autochthonous cases of hydatidosis were 5 times higher in men than women (Miller *et al*, 1971). Sex differences were attributed to occupational exposure to infection.

The number of surgery cases increased up to the patient age of 40. The age group 21-30 years old had 3 times more cases than the age group 0-10. This can be explained by the observation that the older group had more chance of exposure to infested environments and vegetables. In the studies by Isfahani-Zadeh (1960), Moradian (1966), and Mobedi *et al* (1971), the highest infection rates were among the age groups 21-30, 25-35, and 20-29 years, respectively.

Only thirteen patients were recorded to have multilocular cysts. These patients were from: Saveh, Shiraz, Bandar Abbas, Bakhtaran, and Azarbaijan cities. In their files, the species of *Echinococcus* were not determined. These patients may have been from the Moghan area (northwestern Iran) where *E. multiloccularis* has been reported from the red fox. Four other cases had been reported to have multilocular cysts by Firooze-Abadi and Beheshti, in 1975 (one case), and Ghods in 1981 (3 cases).

According to different studies 15.38, 33.3 and 50.5% of dogs had been found infected (Hoghooghi, 1963; Moheb-Ali, 1985; Mohammad Hassan-Zadeh, 1987). These studies clearly explain why those who had contact with dogs had a 66% surgery rate, while those not having contact had a rate of 33%.

Most of the surgery cases in Tehran had only one infected organ, and among these patients, lung cysts outnumbered liver cysts. Lung surgery facilities are more available in Tehran than in other cities, this reason could partly explain why more lung operations for hydatid cysts were done in Tehran rather than other cities. Several investigators reported that the liver infection rates among surgery cases were higher than lung infection rates (Moradian, 1966; Taymoor-poor, 1966; Azizi, 1968, 1973; Edalat, 1977; Mokhtari-Amir Majdi, 1979). Mobedi *et al* (1971) reported that lung hydatidosis was more prevalent than liver among residents of the southern parts of Iran.

Although more than half of the surgery patients had only one cyst but some patients had more than one hundred cysts each, and in a single case a record of more than 1,000 cysts was observed.

The mean length of hospitalization was 37 days in Iran, but it was reported to be 40.4 days in Chile (Ramirez, 1971 cited in Schwabe, 1986) and 7 weeks by Williams *et al* (1971).

The mortality rate was 1.75% among the operated cases reported, but Etebar and Rahbar (1967), Azizi (1973), Tavakoli-Zadeh (1974), reported mortality rates of 4%, 2.5% (for lung), and 12.1%, respectively. Although surgery is the only popular and routine treatment for hydatidosis, some drugs, such as albendazole, had been proven effective in treating some inoperable hydatid cysts (Okelo, 1986).

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