Hydatidosis cases in one of Mar del Plata City hospitals, Buenos Aires, Argentina

Casos de hidatidose em um hospital da Cidade de Mar del Plata, Buenos Aires, Argentina

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ABSTRACT

Hydatidosis is a zoonosis of worldwide distribution produced mainly by the metacestode Echinococcus granulosus*. In Argentina, its distribution reaches endemic levels. The aims of this investigation were to contribute to the knowledge of hydatidosis in the southeast of Buenos Aires province, study its evolution at the Interzonal General Hospital for Acute Diseases between 1992 and 2002 and discuss its importance. Clinical records of operated and/or diagnosed patients were reviewed with regard to this disease. One hundred and twenty cases were analyzed. Among the patients, 56.7% were women. The average age was 42.2±16.8 years. 68.3% lived in urban areas. In 75% of the cases, ultrasonography was used. Hepatic location was most frequently seen. 89.2% received surgical treatment. Albendazole was used for 19 patients. The mean length of hospital stay was 16 days. We conclude that this zoonosis is a disease that generates high costs in medical care and for this reason more epidemiological studies should be carried out and public health authorities should implement control and prevention strategies in the region.*

Key-words: *Hydatidosis.* Echinococcus granulosus. *Epidemiology. Zoonosis. Argentina.*

RESUMO

A hidatidose é uma zoonose de distribuição mundial produzida principalmente pela meta-cestódeo Echinococcus granulosus*. Na Argentina, a distribuição alcança níveis endêmicos. O objetivo desta pesquisa foi contribuir ao conhecimento da hidatidose no sudeste da província de Buenos Aires, estudar sua evolução no Hospital Geral Interzonal para Doenças Infecciosas Agudas, entre 1992 e 2002 e discutir sua importância. Os registros clínicos dos pacientes operados e/ou diagnosticados foram revisados quanto a esta doença. Cento e vinte casos foram analisados. Entre os pacientes, 56,7% eram mulheres. A idade média foi de 42,2±16,8 anos. Um grupo de 68,3% eram residentes urbanos. Em 75% dos casos, foi utilizada a ultrassonografia. Observou-se mais freqüentemente a localização hepática. Um grupo de 89,2% foi submetido a tratamento cirúrgico. Utilizou-se albendazole em 19 pacientes. A duração média da hospitalização foi de 16 dias. Concluímos que esta zoonose é uma doença que gera custos altos na atenção médica e, por isso, mais estudos epidemiológicos devem ser feitos e as autoridades públicas de saúde devem implementar estratégias de controle e prevenção na região.*

Palavras-chaves: *Hidatidose.* Echinococcus granulosus*. Epidemiologia. Zoonose. Argentina.*

Hydatidosis or hydatid disease is an infection of herbivorous animals and humans caused by the larval form of cestodes of the genus Echinococcus. Five species of this genus are recognized at present: *Echinococcus granulosus*, *Echinococcus multilocularis*, *Echinococcus vogeli*, *Echinococcus oligarthrus* and *Echinococcus shiquiccus*. The first of these has worldwide importance and the largest distribution[22 23 24].

More than 2000 cases of human hydatidosis are reported in South America every year. The mean annual incidence of surgical cases per 100,000 inhabitants is around one case in Peru and Argentina, eight cases in Chile and twenty in Uruguay. Despite these indicators, the national incidence rates of surgical cases do not show the real situation of the problem in these different regions, since the denominator is the whole population, which includes a large number of people with low risk of infection[22]. In Argentina, hydatid disease is widespread and reaches its highest endemic levels in the Patagonia region. In the year 2001, 355 cases were reported, of which 46.5% were in Patagonian provinces, 38%

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in the central provinces (Buenos Aires, Córdoba, San Luis and Mendoza) and 15.5% were in the northern provinces of Argentina[19]. In Buenos Aires province, 294 new cases were reported between the years 1997 and 2001, with an annual incidence rate of 0.3/100,000 in the year 2000 and 4/100,000 in the year 2001[19]. In this province there are two areas: a low endemicity area in the north and a high endemicity area in the south. 47.5% of the rural population inhabits the area of highest endemicity, where there is one dog per inhabitant[4].

Epidemiological studies of hydatidosis were carried out in the southeastern region of Buenos Aires province by Elissondo et al, who observed a worrying situation in health centers in Mar del Plata City, due to the great numbers of cases diagnosed during the period 1992-1998[5,6]. The investigation by Dopchiz et al also needs to be borne in mind, which showed that hydatid disease might be endemic in the region, since they presented 242 human cases in the period between 1996 and 2001 and a prevalence in cattle which went from 12% to 16% approximately[3].

Taking these investigations into account and considering that the southeast of Buenos Aires province is not at present within the activities of the province's control program, hydatid disease is a major public health problem in General Pueyrredón district and neighboring areas.

The main objectives of this study were to contribute towards the knowledge of human hydatidosis in the southeast of Buenos Aires province, study its evolution in the *Dr. Oscar Alende* Interzonal General Hospital for Acute Diseases (HIGA) between 1992 and 2002 and discuss the importance of this disease through the results obtained in that institution.

MATERIAL AND METHODS

The study area was in the City of Mar del Plata, which is the principal city in General Pueyrredón district, located on the seacoast in the southeast of Buenos Aires province, Argentina (38° S; 57°33'W).

This study was carried out in HIGA. This institution provides medical care for a wide area of the southeast of Buenos Aires province as a reference consultation center for patients from several municipal centers.

The clinical records of all the patients who were diagnosed or operated on for hydatidosis between 1992 and 2002 were analyzed. A data file was completed for each patient, containing personal information, antecedents, diagnostic methods and the number and location of cysts present. All the information was loaded into and analyzed using the *Epi 6* microcomputer software for handling epidemiological data (version 6, CDC, Atlanta, USA). The *Epitable* software was used in order to calculate X^2. The annual incidence of hydatidosis was calculated in HIGA using data from the National Population and Household Census, 2001[10]; in other words, the number of new registered cases in the institution per year and locality was divided by the population of the region. The official notification records were used to compare the incidence between 1998 and 2002 with the incidence of hydatidosis in HIGA during the same period[9].

Not only the patients' present place of residence but also any time during their lives that was spent living in a rural area was taken into consideration in order to determine the patient's origin.

RESULTS

During this study, 120 cases of hydatidosis were identified and analyzed in HIGA. The distribution of cases according to sex and occupation can be seen in Table 1. The frequency according to sex did not show any meaningful statistical differences, but merely a tendency (X^2; p = 0.14).

Table 1 - Distribution of cases according to sex and occupation.

Occupation	Sex				Total	
	female		male			
	nº	%	nº	%	nº	%
Unknown	36	30.0	28	23.3	64	53.3
Homemaker	20	16.7	1	0.8	21	17.5
Several occupations	6	5.0	9	7.5	15	12.5
Rural worker	4	3.3	12	10.0	16	13.3
Student	2	1.7	2	1.7	4	3.4
Total	68	56.7	52	43.3	120	100.0

X^2 tendency (sex) = 2.13; *P*= 0.14 ns.

Several occupations: bricklayer, car repairer, employed, mechanic, baker, retired, street vendor.

The age distribution is showed in Figure 1. It ranged from 15 to 84 years, with a mean age of 42.2 ± 16.8 years and a median of 42 years.

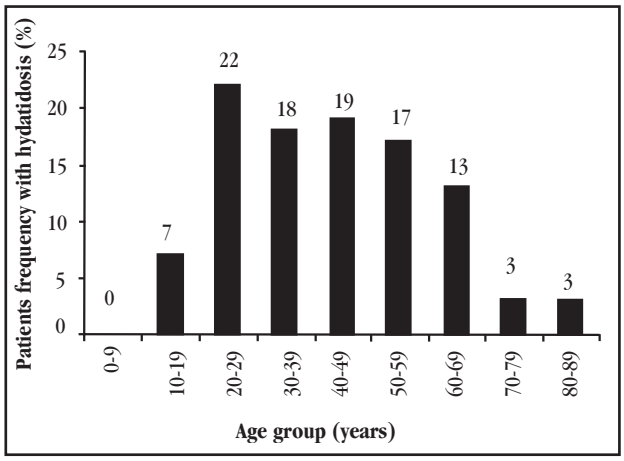

Figure 1 - Distribution of the 120 hydatidosis cases according to age.

The distribution of the cases according to place of residence indicated that 68.3% of the patients lived in an urban area, 15.8% in a rural area and 8.3% on the periphery of urban areas. The place of residence of 7.5% of the cases could not be determined.

The methods used in diagnosing the disease are shown in Table 2. Ultrasonography alone or combined with other diagnostic techniques was the chosen method for 75% of the patients. In 30% of the cases, a combination of axial computed tomography

and ultrasonography was used. The immunological techniques of Arco5, latex or immunofluorescence were used in 20.2% of the patients.

The cyst locations are shown in Table 3. Regarding the numbers of cysts, 79 (65.8%) patients presented only one cyst, 26 (21.7%) patients two cysts, 5 (4.3%) patients three cysts, 8 (6.7%)patients multiple cysts and in two (1.7%) of the patients the quantity was unknown.

Out of the 120 patients, 107 (89.2%) received surgery, 12 (10%) did not receive surgery and for one of the patients this information was unknown. The mean number of operations per patient was 1.4, with a range from 1 to 5. Among the patients who received surgical treatment, 19 (17.8%) patients received medical treatment with albendazole before surgery and 15 (14.2%) received medical treatment after the surgery. Only 11 patients received pre and postsurgical treatment. Two nonoperated patients received pharmacological treatment with albendazole.

With regard to length of hospital stay, the patients were hospitalized for varying periods of time, ranging from 1 to 302 days in all. The mean was 16 days, and there was a displacement of the curve to the right (25^{th} percentile = 9.5; 75^{th} percentile = 24). Out of the 107 patients who received surgery, four (3.7%) of them died because of excess infection of the cavity, cardiac/respiratory arrest and bronchopneumonia. In one of the cases, the cause of death was not filed in the medical records.

The annual incidence of hydatidosis in HIGA and the annual incidence according to official notification of human hydatidosis in relation to the place where the patients came from during the study period are showed in Table 4. It is worth mentioning that all the patients in this investigation live in Sanitary District Number 8.

Table 2 - Diagnostic techniques.

	Diagnostic	
Type	nº	%
CT + US	36	30.0
US	28	23.3
CT + US + other	21	17.5
CT	15	12.5
CT + other	11	9.2
US + other	5	4.2
Other	3	2.5
RX + other	1	0.8
Total	120	100.0

CT: computed tomography, US: ultrasonography, RX: X rays, Other: includes the combination of one or more of the following techniques: US, CT, X Rays, Arco5, nuclear magnetic resonance, indirect hemagglutination, endoscopy, lung gammagraphy and immunofluorescence.

Table 3 - Distribution of the 120 cases of hydatidosis according to cyst location.

Location	Frequency	Percentage
Liver	64	53.3
Lung	27	22.5
Lung/liver	12	10.0
Liver/other	6	5.0
Spleen	2	1.7
Lung/other	2	1.7
Spleen/peritoneum	1	0.8
Bone	1	0.8
Unknown	1	0.8
Peritoneum	1	0.8
Lung/liver/other	1	0.8
Lung/kidney	1	0.8
Kidney	1	0.8
Total	120	100.0

other: spleen, abdominal cavity, heart, middle colon, pancreas, pelvis, supra-renal.

Table 4 - Annual incidence of human hydatidosis registered in Hospital Interzonal General de Agudos* Dr. Odcar Alende *and annual incidence according to official notification in the study region*[11].

District	Annual incidence*										
(population[10])	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Ayacucho (19,634)	5.1	0	0	0	0	0	0	0	0	10.2	5.1
Balcarce (41,194)	2.4	2.4	0	4.9	0	0	0	0 (11.9)	2.4	0 (2.4)	0
La Costa (38,603)	0	2.6	0	0	0	0	0	2.6	0	0	2.6
Gral. Alvarado (30,385)	0	0	3.3	6.7	0	0	0	0	9.9	0	0
Gral. Guido (2,857)	0	0	0	0	0	0	0	0	35	35	35
Gral. Madariaga (16,923)	0	0	0	0	0	0	0	0	0	0	6
Gral. Pueyrredón(532,845)	0.6	1.9	1.9	1.9	1.3	0.7	0.2 (0.2)	1.5 (0.2)	0.4 (0.2)	0.4	0.6
Lobería (17,647)	0	0	0	0	5.7	0	0 (11.8)	5.7 (29.6)	0 (11.8)	5.7 (11.8)	0
Maipú (10,042)	0	0	10	0	0	0	0	10 (19.8)	0	0	0 (19.8)
Mar Chiquita (14,884)	0	0	6.7	20.2	13.4	13.4	0	0	6.7	6.7	0
Necochea (84,581)	2.4	1.2	1.2	3.5	0	1.2	0	0	1.2	0	1.2 (1.1)
Pinamar (10,316)	0	0	0	0	0	9.7	0	0	0	0	9.7
San Cayetano (8,687)	11.5	0	0	11.5	0	0	0	0 (12.3)	0 (24.6)	0	0
Tandil (101,228)	0	0	0	0	0	0	0 (2.8)	0	1 (2.8)	0 (2.8)	1 (2.8)
Villa Gesell (16,012)	0	6.2	0	0	0	0	0	0 (8.5)	0 (4.2)	0	0
Total (945,838)	0.8	1.5	1.5	2.3	1.1	0.8 (1.2)	0.1 (0.6)	1.2 (1.5)	1.1 (0.7)	0.7 (1.1)	1.1

*The incidence values according to official notification are presented in brackets.

DISCUSSION

The analysis of the results from this study showed that hydatid disease is an important zoonosis in this region. The distribution of the cases according to sex shows that there were no statistically significant differences. This is in agreement with studies conducted by Elissondo et al[6], in which four health centers at the same locality were analyzed. Despite these results, it was observed that within the female group, most of the cases were presented by women who did household chores; while within the male group, rural workers presented most of the cases. It needs to be borne in mind that the occupations of the whole population who received care in this hospital during the period of this study were unknown and, for this reason, we cannot indicate any relationship between occupation and illness. Nonetheless, the transmission of this illness by means of water and the likelihood of inadequate washing of raw vegetables can not be ruled out, since zoonotic parasites have been reported to be found in vegetables for human consumption[17 21]. Hydatid disease is generally considered to be a rural disease because of the characteristics of its transmission cycle, which involves domestic herbivorous animals (cattle, sheep, pigs and so on) and dogs[18]. This study reported that the occupations of 53% of the study patients were unknown: this was due to the fact that in many cases the anamnesis was incomplete.

The distribution according to age showed that the etiological agent was present in all age groups. This was also so for the following disease characteristics: ingestion of parasitic eggs, host resistance to cyst development, speed of development of symptoms and later detection. Accordingly, cyst development can be very fast (5 or 10cm in a few years), thus possibly generating serious symptoms with a risk of death for the host, or the cyst can behave benignly, growing to no more than 2 to 7cm, and may grow old with its host without showing major symptoms[7 12 13].

Regarding the patients' distribution according to their place of residence, it was observed that the majority of the patients were living in urban areas. This is probably due to migration, i.e. the movement of people from the country to the cities[11]. However, it is possible that urban residents may have been in contact with *Echinococcus granulosus* eggs in the city. Dopchiz et al reported the presence of antigens of *Echinococcus granulosus* in a soil sample from the city of Mar del Plata[4]. It is worth mentioning that this information was missing from several medical records. As mentioned above, it is important to know not only the present place of residence but also the patient's life history.

Concerning diagnostic methods, ultrasound alone or in combination with other techniques (such as CT, immunological techniques and so on) was the method most frequently used. Although ultrasound is widely known because of its low operating cost, speed in obtaining results and high sensitivity and specificity in relation to prevention of this parasitosis[1 8 14 15], in this health center it was generally used with other diagnostic methods.

The cysts most frequently had a hepatic location; pulmonary and hepatic/pulmonary locations were the next in frequency. The liver-lung relationship found in this study was 2.4:1. This is close to what Larrieu and Frider reported in a bibliographic review on 9,770 people with hydatidosis from Uruguay, Argentina, Tanzania, New Zealand, Israel, Jordan, Australia, Bulgaria, Turkey and Iran with values ranging from 0.89:1 to 12:1 and a general ratio of 2.5:1[16].

Regarding disease treatment, this study shows that surgery was the chosen treatment in 89.2% of the cases. Pre and postsurgical chemotherapy treatment was relatively limited in this health center. Cystic echinococcosis has traditionally been considered to be a disease requiring surgical resolution. However, alternative methods have been developed over the last few years, such as chemotherapeutic treatment with albendazole at a dose of 10mg/kg for 120 days[2 12 16 20].

The results obtained in this investigation regarding length of hospital stay and the number of operations per patient show the high cost that this disease has for the institution (hospital stay, pre and postsurgical expenses, medical costs, etc.) and social expenses[12] (long stays in surgical centers often far from the host's address, loss of work days, loss of physical capacities and even risks to life).

HIGA is a reference health center in Sanitary Area Number 8, and hydatidosis cases were found in all the districts that are part of it. The number of cases that were attended in this hospital over the 11-year period of this study allows us to conclude that this zoonosis is a public health problem in General Pueyrredón district and Sanitary Area Number 8. The annual incidence values for the entire region remained constant over the study period. Although the incidence values calculated for the hospital are not representative for the region or for any of the districts, these values show that there is high year-on-year variation according to the locality. This shows that the permanence of this disease in the region has depended on natural transmission of the parasite, in the absence of control and prevention measures.

To have a real view of the situation of this zoonosis, more epidemiological studies must be conducted in this and other intermediate hosts, as well as in the definitive host. Even so, the conclusions reached in this investigation and the contributions of Dopchiz et al[3] and Elissondo et al[5 6] are enough for the health authorities to make the decision to implement prevention and control strategies for this disease in the study area.

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