



Echinococcus granulosus infection in domestic dogs in urban and rural areas of the Coquimbo region, north-central Chile

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ABSTRACT

Hydatidosis is a zoonotic disease caused by the cystic stage of the cestode parasite *Echinococcus granulosus*, in which the definitive hosts are mainly domestic dogs. This parasite is regarded mainly as a rural disease, where man is exposed through contact with eggs excreted by definitive hosts; however, some studies have shown that domestic dogs can get infected within urban areas. This study was conducted to assess differences in prevalence of *E. granulosus* in urban and rural sites in Coquimbo region of Chile. From 2005 to 2006 a cross-sectional household questionnaire survey was conducted in Coquimbo and Ovalle cities, in three towns and in rural sites along two transects from these cities to the Fray Jorge NP in the Coquimbo region. Faecal samples were collected from dogs during the questionnaire survey and tested for *Echinococcus* coproantigens. Positive dogs were found in urban areas. Analysis of risk factors indicated that dogs inhabiting the borders of urban areas were at greater risk of being coproantigen positive than those in the centre of these areas. These results are likely to be related to the custom of slaughtering livestock at home in urban areas during local celebrations, which could favour the importation of *E. granulosus* to urban areas by acquiring livestock contaminated with cysts from rural sites. This study shows that surveillance and control measures in livestock and domestic dogs need to be introduced in urban areas as well as rural areas of the Coquimbo region to reduce the public health risk of hydatid disease.

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1. Introduction

Hydatidosis is a zoonotic disease caused by the cystic stage of the cestode parasite *Echinococcus granulosus*. This cestode has a cosmopolitan distribution, with a hyperen-

demic prevalence in South America (Arambulo, 1997). In the life cycle of *E. granulosus*, the definitive hosts are mainly domestic dogs. Adult cestodes inhabiting the small intestine, shed eggs into the environment during animal defecation, contaminating pasturelands.

The maintenance of *E. granulosus* is favoured by human behaviour of feeding domestic dogs, with viscera of infected livestock (Eckert and Deplazes, 2004). In addition, dogs fed with offal, that are not de-wormed regularly, and unrestrained and owners with no knowledge of hydatidosis have also been identified as risk factors in endemic

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areas (Buishi et al., 2005). Age is also a known risk factor associated with the presence of the parasite in domestic dogs; younger dogs test positive more often than older ones and have higher worm burden (Buishi et al., 2005).

Hydatid diseases is regarded mainly as a rural disease (Eckert and Deplazes, 2004). However, some studies carried out in urban areas of developing countries have shown that domestic dogs that scavenge near or within slaughterhouses, are at risk of ingesting *E. granulosus* infected offal (Wachira et al., 1994; Moro et al., 2004). This study was conducted to assess differences in prevalence of *E. granulosus* in urban and rural sites in a coastal area within the Coquimbo region of Chile. Additionally, risk factors for coproantigen positivity in domestic dogs were studied by a cross-sectional faecal sampling of owned domestic dogs.

2. Materials and methods

2.1. Study site

The study area comprised 1600 km² (71°12' to 71°40'W, 29°58' to 30°39'S) and included two cities (Coquimbo with a human population of ~148,500 inhabitants and Ovalle with a human population of ~66,500), three towns [Guaqueros, Tongoy and La Torre

with a human population of less than 5000 inhabitants; INE, 2005] and several small human settlements in the Coquimbo region with a low human density of 2.0 individual/km² (see Fig. 1).

2.2. Study design

A cross-sectional study design was used with a stratified sampling strategy of dogs in rural and urban areas (for further details see Acosta-Jamett, 2009). The sampling was conducted along two transects from the Coquimbo and Ovalle cities to the Fray Jorge National Park (FJNP). The first transect from Coquimbo city to the FJNP consisted of 80 km north–south, which included sites A, B, C, D and E (Fig. 1). Also, sampling along a 40 km east–west transect from Ovalle city to the FJNP was carried out, including sites F and G.

2.3. Dog-owner questionnaire

A questionnaire survey was conducted to determine the risk factors for canine echinococcosis. The owner of each dog was asked a series of questions related to dog-keeping practices. Questions were made to know the dog age, sex, and if owners slaughtered their livestock at home, and if whole dead animals were bought as a source of meat. Also,

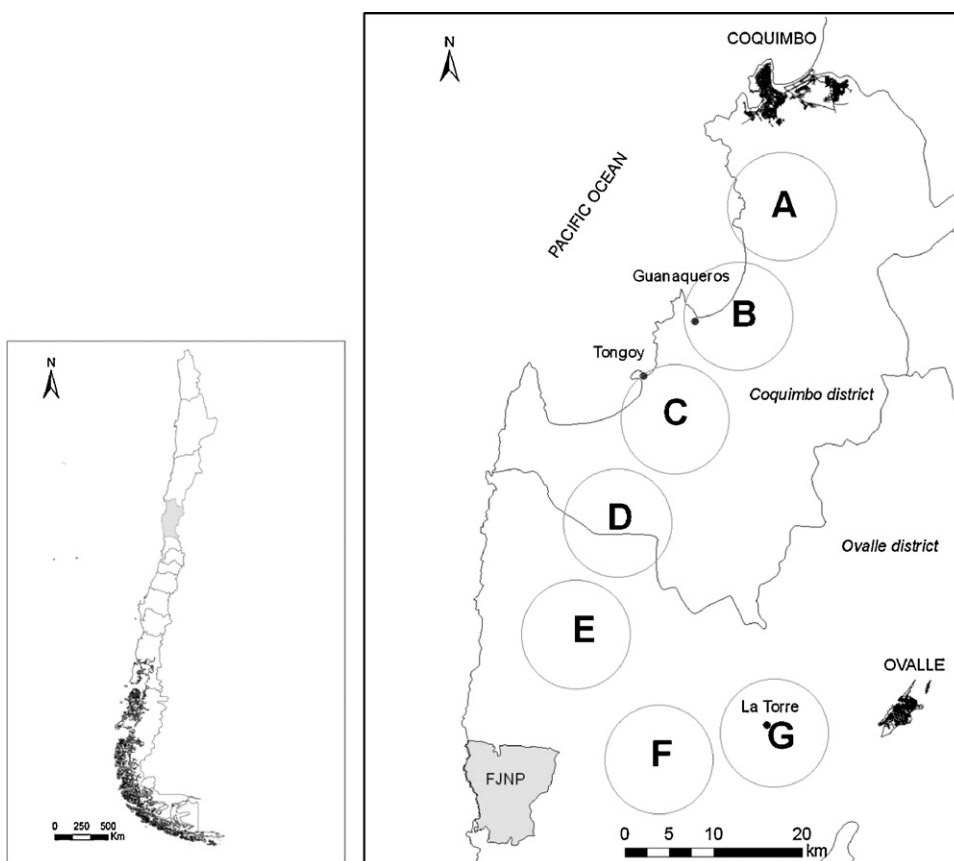


Fig. 1. Study area in the Coquimbo region (shaded area to the left). Two transects from Coquimbo and Ovalle cities through rural sites are shown. Seven sites along these transects were delimited by circles, within which the questionnaire survey was conducted. In gray the Fray Jorge National Park. Black dots show towns in the area.

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