BOVINE TUBERCULOSIS IN OTHER DOMESTIC SPECIES: REPERCUSSIONS ON HUMAN HEALTH IN SPAIN SEEN FROM A HISTORICAL PERSPECTIVE

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RIASSUNTO

LA TUBERCOLOSI BOVINA NELLE ALTRE SPECIE:
RIPERCUSSIONI SULLA SALUTE UMANA IN SPAGNA ANALIZZATE DAL PUNTO DI VISTA STORICO

La tubercolosi era un’infezione comune a tutti gli animali domestici, ma inizialmente fu scoperta che non tutti gli animali erano infettati allo stesso grado o frequenza. I bovini, benché non fossero i soli animali infettati, erano, senza dubbio, i più colpiti e i più devastati dalla malattia. Oggi, le rassegne storiche che hanno studiato l’origine animale dell’infezione tubercolare nell’uomo si sono focalizzate quasi esclusivamente sui bovini. In passato, tuttavia, il ruolo di altre specie nella trasmissione zoonotica fu oggetto di interesse e discussione. Questo e l’aspetto che sarà sviluppato con questo lavoro: studiare l’importanza storica attribuita alle altre specie come fonte di infezione tubercolare nell’uomo e valutarne le conseguenze.

Tuberculosis was a common disease which affected all domestic animal species. However, it was soon determined that it did not affect them to the same extent, nor at the same frequency. Beyond any doubt, cattle were the most prone species to this illness and the most afflicted with it.

The historical revisions that have studied the animal sources of human tuberculosis infection have almost exclusively focused on cattle. Nonetheless, in the past, the involvement of other species in the transmission of this zoonosis was a matter of interest and concern. This is precisely the aspect to be expounded in this paper: to study the historical importance that was once given to other animal species as a source of tuberculosis infection for the human species and to evaluate its consequences.

Avian tuberculosis

At the beginning of the 20th century, one of the most discussed questions was the relationship between mammalian tuberculosis and avian tuberculosis. Until then, the causative agent of avian tuberculosis had been considered to be an independent bacillus without any link whatsoever to the human and bovine tuberculosis germs. However, it then started to be regarded not as a different species, but as a variety.

This change of opinion originated from a movement that reached its maximal development in the 1920s and maintained that the human, the bovine but also the avian tuberculous bacilli were a single species capable of adapting to the different organisms it infected and acquiring distinctive features in each host.

An early example of this new tendency is the paper presented before the Antituberculosis Congress of Barcelona in 1910 by Juan Manuel Díaz Villar (1857-1944), professor of hygiene in the Escuela de Veterinaria de Madrid. He contended that the identity of avian and mammalian tuberculosis was already accepted by almost all bacteriologists and that the classically branded divergences between such illnesses lacked importance, since the human and avian-derived bacilli represented two varieties of the same species and that those differences were due to the influence of the environment in which they lived. The author considered that all types of tuberculosis were the same entity and added: “beyond any doubt, the avian bacillus plays an important role in the aetiology of the tuberculosis developed in mammals, since this microphyte can be found in man and ox struck by the disease”.

As a preventive measure, he sug-
suggested sacrificing all the affected birds on the grounds of the danger they represented to humans: “Birds kept in cages are more fearsome, on the basis of the close contact they maintain with their owners. There are reported cases of human tuberculosis transmitted by affected birds, particularly the parrot, which transmits the illness with the greatest ease.”

In the Antituberculosis Congress in San Sebastián in 1912, the same author reaffirmed his points of view on the hygienic repercussions of avian tuberculosis, emphasizing that, although most animals could get infected, not all of them had the same susceptibility: “Poultry are very exposed to the contagium and they possess a maximal degree of receptivity, especially hens, pheasants and ducks, where the infection spreads easily.”

In 1916, doctor and veterinary surgeon Pedro Farreras (1876-1955) claimed that the vigorous fight against avian tuberculosis helped avoid tuberculosis in many domestic animals, above all, man. He presented some data concerning the frequency of the disease in hens, pheasants and pigeons and underlined the pressing need to subject poultry meat to veterinary inspection.

In the 1920s the pathogenic capacity of avian bacillus towards mammals was elucidated, when the theoretical principles on which it was based could not be scientifically proven. Indeed, the tuberculosis acid-resistant bacillus was more stable than had been thought and the alleged environment-derived mutations or microbial transformations from one type to another did not actually exist. The ability to identify a bacillus specific to avians made it possible to state with complete certainty that the avian disease was not a threat to the human species.

**Caprine and ovine tuberculosis**

The case of tuberculosis in small ruminants was different, particularly in goats, which had traditionally been considered to be immune to the illness. That is why the use of goats’ milk instead of cows’ milk was frequently recommended as a measure to protect public health. Furthermore, goats’ milk was relatively accessible to the population because of the high goat stock in many areas of the Spanish territory. Recognized doctors such as Espina y Capó (1850-1930) and Lluís Sayé (1888-1975) were among the phthisiologists who regarded goats as animals resistant to tuberculosis.

In the Antituberculosis Congress of Barcelona in 1910, veterinary surgeon José Mas Alemany (1868-1939) tried to banish the false belief that goats were resistant to the disease. This matter, which was first discussed in the Congress of Zaragoza in 1908, was approached more extensively in Barcelona. Drawing on his own personal experience as a technician in the General Slaughterhouse of Barcelona, Mas stated that he was able to demonstrate that goats were much more susceptible to the disease than had been believed, even among the veterinary surgeons themselves: “Some years ago, when a real tuberculous goat was detected in the slaughterhouse, it was cited as an extraordinary case, and we still know some veterinary surgeons who doubted whether it was a true case of tuberculosis.”

In the Congress of San Sebastián, Mas Alemany confirmed the viewpoint he had previously explained in Barcelona and that had led him to consider the milk goat as one of the most prone species to the illness.

The confirmation of this fact laid new grounds for concern among hygienists. However, the belief that small ruminants were resistant to the illness was so firmly rooted that Rafael Rodríguez Méndez (1845-1919), professor of hygiene in the Faculty of Medicine of Barcelona, declared himself in public in favour of the sacrifice of all the cattle stock and its substitution by this other type of livestock. In Rodríguez Méndez’s opinion, the fight against bovine tuberculosis represented the best preventive measure against hu-
man tuberculosis. After showing the different proposed methods to avoid this risk and assessing their effectiveness, he concluded that faced with the threat of bovine tuberculosis and the difficulties of overcoming it, the sensible thing to do was to change the approach and replace bovine-derived food by food coming from other less dangerous species. That is why he supported replacing cattle by sheep, goats and horses: “I would say more: this agreement is urgent, and, each one must strongly contribute to the execution of the substitution soon, depending on his resources and situation”.15

To Pedro Farreras, goats and sheep were less affected by tuberculosis; this was probably due to their living outdoors, whereas cows spent their entire lives housed in unhygienic barns.16

Indeed, so it was the level of resistance of goats and sheep to tuberculosis was not due to their being less prone to it than cows. It was not a matter of a species sensitivity or resistance to the tuberculous infection, but of several conditions depending on the characteristic farming system for each type of livestock. Therefore, tuberculosis in sheep and goats, which was rare and sporadic in general, became more frequent if these animals were raised in intensive farming systems, which were common in cattle. This was especially important in areas with large small ruminant stock, the southern half of the Iberian Peninsula,17 for example. It is not surprising that numerous antituberculosis treatises, which were a popular source of instruction and teaching methods designed to promote awareness of hygiene and advice to prevent the illness, introduced a specific note that warned against the danger entailed by goats’ and sheeps’ milk.

**Equine and swine tuberculosis**

The low frequency 18 of equine tuberculosis was possibly due to concurrent low phthisiogenic factors, similar to those reported for small ruminants, during the zootechnical handling of these animals. The public health consequences were fewer, as the use of horses as a food source has always been low in Spain.19

With reference to pigs, veterinary surgeons from northern Europe were the first to approach the problem and demonstrate a high percentage of affected animals, particularly among pigs fed on milk plant waste.20 It could be assumed that the incidence in Spain was lower, since this route of transmission was not present. This aspect was poorly studied by the Spanish veterinary surgeons of the first half of the 20th century. José Farreras and Sanz Egaña believed that the legislation should be much stricter for pork than beef, as pork was sometimes consumed raw.21

In 1945, the publication of a report on swine tuberculosis, which Pedro Carda had presented a year before to obtain the diploma in advanced studies in Veterinary Science, did not make any conclusions as to the harmfulness of pork to humans - but it did give some discrete percentages of the frequency of swine tuberculosis in the slaughterhouse of Madrid.22 In any case, as the vector involved is meat, not milk, the possibility that humans are infected by consumption of meat can be considered to be exceptional.

**Canine tuberculosis**

Finally, one may allude to tuberculosis in dogs, which could become infected by massive and repeated exposure when living alongside human patients.23 Although a tuberculous dog unquestionably represented a potential risk, only a few cases of transmission from dogs to humans have been proven, which leads to the supposition that the occurrence of this form of transmission has been very limited from a historical point of view.
NOTES


2 This tendency was led, among others, by Calmette, who was the father of the BCG vaccine. In the Antituberculosis Congress held in Washington in 1908, Calmette maintained that the tuberculous bacillus was pleomorphic and that the transformations resulted from the lengthy stays in the different animal species. The learned Frenchman only referred to the transformations from the bovine to the human type and vice versa. However, this position was shared by other French and English representatives present in the congress, and it represented the beginning of a tendency which would strengthen all over the world and which soon after would apply the same reasoning to the avian tuberculosis bacillus. Cf. B.G. Rosenkrantz, The trouble with bovine tuberculosis. Bulletin of the History of Medicine, 1985,59: 155-175.


8 The first reference I have found in the Spanish literature that rejects the alleged immunity of the goat to tuberculosis dates from 1891. It consists of a translation of a note which was presented that very year in the Academy of Sciences, Paris. In: Cabrera no es refractaria a la tuberculosis (La). Quotation by Mr. G. Colin, retired teacher of the School of Veterinary Medicine in Alfort, and presented in the Academy of Sciences in Paris, July 27th 1891 by Mr. Bouchard, La Veterinaria Española, 1891, 34: 449-451.


12 J. Mas Alemany, La tuberculosis en la cabra. Revista Veterinaria de España, 1910, 5: 100-103.


14 The articles that merely registered cases of tuberculosis in small ruminants became more frequent in the veterinary literature in those years. J. Ravetllat,


17 Sanz Egaña emphasized that there were big cities, in Andalucía for example, where goats’ milk represented more than 90% of the population’s consumption. This percentage was even higher in rural areas. In: SANZ EGAÑA, C. Contribución al estudio de la inspección y reglamentación del abasto de la leche de cabra. Revista Veterinaria de España, 1918, 12, 97-116.


19 P. CANO RODRÍGUEZ, J. SÁNCHEZ DE LOLLANO PRIETO, C. BALLESTEROS VICENTE, La evolución del consumo de carne de caballo (Hipofagia) en España en la transición del siglo XIX al XX. In: V Jornadas Nacionales de Historia de la Veterinaria, Barcelona, Facultat de Veterinaria de la Universitat Autònoma de Barcelona; Col.legi oficial de Veterinaris de Barcelona, 2000, pp. 109-111.


22 P. CARDA APARICI, Contribución... cit.
