

The 1711 rinderpest in Bernardino Ramazzini's XIII Oration and the COVID-19 public health emergency: facts and common aspects

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SUMMARY

Although Bernardino Ramazzini is usually regarded only as the father of occupational medicine, his approach to fight the devastating rinderpest epidemic in 1711 is worth mentioning in the light of the public health emergency represented by Coronavirus Disease-2019 (COVID-19). This commentary (i) focuses on Ramazzini's XIII oration describing that event, (ii) analyses the approach suggested to fight the cattle epidemic and economic threats, (iii) highlights some similar aspects between the 1711 rinderpest epidemic and the current COVID-19 pandemic (team expertise, contagion transmissibility, drug treatment, preventive measures, decision timeliness).

RIASSUNTO

«L'epidemia di peste bovina del 1711 nell'orazione XIII di Bernardino Ramazzini e l'emergenza sanitaria COVID-19: fatti e aspetti comuni». Sebbene Bernardino Ramazzini sia conosciuto da lungo tempo soprattutto come padre della medicina del lavoro, il suo approccio nel contrastare la devastante epidemia di peste bovina nel 1711 è meritevole di attenzione alla luce dell'emergenza di sanità pubblica rappresentata dalla cosiddetta Coronavirus Disease-2019 (COVID-19). Questo contributo (i) focalizza i principali aspetti dell'Orazione XIII che ha descritto l'evento, (ii) analizza l'approccio della commissione, presieduta da Ramazzini, istituita allo scopo di contrastare l'epidemia, (iii) illustra alcuni aspetti comuni all'epidemia di peste bovina e alla pandemia COVID-19 (competenze della commissione, trasmissione del contagio, trattamento medico, misure preventive, tempestività delle decisioni).

INTRODUCTION

Bernardino Ramazzini has long been recognized as a pioneer of a new discipline (17) and acknowledged as the father of occupational medicine (8, 11). Some aspects of his works are still analysed (1, 2, 9,

26) and revisited (10). His contribution to fighting a devastating rinderpest epidemic is much less well known. The commitment of the *Magister* is worth mentioning in the light of the way the scientific community is facing challenges due to the Coronavirus Disease-2019 (COVID-19) pandemic (7, 28).

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The issue of workers' exposure to COVID-19 risk has recently been raised by an editorial published in this journal (14). It mentions the key role played by occupational health physicians by discussing their additional tasks and responsibilities in managing workers' health in a potentially hazardous environment. Current orientations as to the best course of action highlight that even in the time of an epidemic, governments and employers have legal obligations to protect worker health. Accordingly, the levels of workers protection must not be reduced, infection control measures should be implemented, disease identification and isolation policies should be established, and personal protective equipment programs should be supported (12).

RINDERPEST EPIDEMIC, AN EMERGENCY IN THE EIGHTEENTH CENTURY

The rinderpest epidemic event is reported in the XIII oration delivered on 9 November 1711 (23, 24). On that occasion, Ramazzini pronounced the well-known precept "far better to prevent than to cure". The oration describes a severe epidemic of rinderpest that struck the territory of the Venetian Republic in 1711. Rinderpest or cattle-plague was a highly contagious panzootic affecting cattle known since the domestication of livestock. It was usually transmitted through direct or close indirect contact with infected animals with a death rate approaching 100% (9). At present, it is the second eradicated infectious disease after active interventions have been undertaken (16). The oration reports that the event caused great alarm due to the importance of animal husbandry in the Po valley, though the disease apparently did not threaten people's health. The sudden decrease in animals could not but alarm the authorities of the Republic of Venice, the Duchy of Milan, the Legations of the Papal States, and the small Emilian States that attempted preventing the spread of the disease.

RAMAZZINI AT THE HELM OF A MULTIDISCIPLINARY TEAM

One month after the beginning of the pestilence, the Senate of Venice asked Ramazzini and

other doctors from Padua College to investigate the pressing public health issue (5). It might seem unusual for a distinguished doctor to examine a livestock problem. Nonetheless, Ramazzini had a valuable experience and a thorough knowledge of infectious diseases as witnessed by many observations reported in a variety of occupations, such as midwives (1), laundresses, corpse-bearers and others (10). He did not refuse to dedicate his attention to problems that went beyond medical matters. The *Magister* was convinced that when a biological phenomenon was recognised, it was necessary to analyse and discuss it not only on one's own experience but also valuing other scientists' expertise. To investigate the outbreak and identify the source of illness, he asked the collaboration of anatomists and veterinarians. He was aware of some criticism raised by his colleagues for his interest outside the realm of medicine: "I know that someone will accuse me of having deviated to Veterinary medicine; let them bark as much as they want" (20).

As to the clinical aspects of the animals disease, the oration describes symptoms ("a fever malignant and lethal [...] pestilential [...] difficult breathing, wheeziness [...] stupor and a sort of coma") emphasising that skin lesions resemble those of smallpox ("little swelling similar to smallpox pustules"). It remarks their latency ("its virulence does not make itself immediately clear") and the lethal prognosis ("most of them die between the fifth and seventh days"). The oration reports the results of the dissections made by anatomists on infected animals: the carcasses were often dehydrated and emaciated. Regarding the value of postmortem dissection and examination, it could be reminded that on different occasions Ramazzini supported the need to perform autopsies to explain the origin of diseases: "it is necessary to examine with frequent inspections the innards of bodies that have just died and are still hot" (22, 24). As to the possible source of contagion, the oration makes some persuasive considerations. Firstly, it excludes the theories founded on dirty air, contaminated pastures, or even astral influences. Secondly, it assumes that the contagion affecting above all susceptible people is caused by a "*morbusus semen*" easily multiplying and rapidly propagating in closed and circumscribed spaces. Few years later

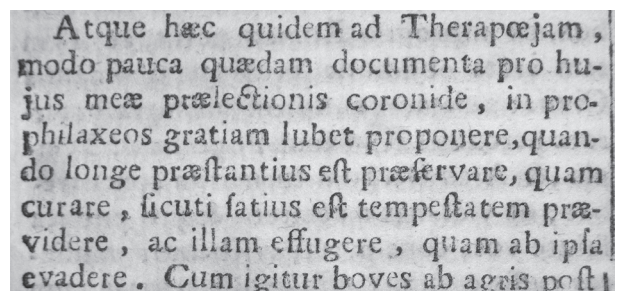
the difference between the contagion and the idea of living organisms able to multiply and spread was given full expression (3, 5).

EMPHASIS ON CONTROL AND PREVENTION

Over two-thirds of the oration is devoted to treatment and prevention measures to fight the epidemic. Ramazzini was aware that facts and observations should guide every decision made by doctors. Also, he had a profound conviction: "In the medical practice, the simplicity of remedies should be preferred to complex preparations" (21, 24). Therefore, he disputed the doctors who were afraid of not being sufficiently valued if they did not write very long recipes even for a well-known and uncomplicated ailment. Doubtful about the effectiveness of most drugs, on the occasion of the epidemic, he suggested treatment with quinine in the early stage of fever. However, he was also sceptical about the value of this drug, since he believed that there was no specific remedy (*"particulare, & specificum veneni remedium"*). Convinced that the epidemic would have followed its ordinary course, he paid most of his attention to control measures. He strongly suggested burying the dead cattle in untilled land or in meadows that were not used for cultivation and recommended that the graves should be deep. Besides, he was cautious as to whether cattle that appear to be healthy might be safely eaten by men. On this issue, he raised some doubts. Most of all, he insisted on simple practices: to keep barns clean, to frequently fumigate the environment, to isolate other animals, and to provide fresh and clean hay and straw. Consequently, the final report of the task force proposed some measures to contain contagion including the lockdown of infected animals. Following the recommendations of the experts, the Magistrate of Health in Venice, who had the responsibility to protect people's health and contain the spread of epidemics among the population, activated controls and prevention procedures against the bovine epidemic. The Serenissima banned the sale of meat and hides of sick animals, limited livestock businesses and the transfer of herds, imposed strict rules on the burial of the carcasses and on the freedom of movement of the people who had been in contact with infected animals (5).

FAR BETTER TO PREVENT THAN TO CURE

In the XIII oration that represents a paramount step in public health, we can appreciate some principles that are now widely accepted. These principles have been applied to human diseases and have become cornerstones of modern public health practice (13). The expression that declared the higher effectiveness of prevention over cure embodies Ramazzini's vision: "*In prophylaxeos gratiam lubet proponere, quando longe præstantius est præservare, quam curare, sicuti satius est tempestatem prævidere, ac illam effugere, quam ab ipsa evadere*" (I would like to conclude with a few preventive arguments, since it is far more critical to preserve than to cure, just as it is better to foresee the storm and avoid it, rather than to escape from it) (Figure 1). This unmistakable assertion anticipates the sentence he used some years later in the dissertation on nuns' health that appeared in the *Diatriba* new edition (19). In the dissertation, he explained with other words the already expressed concept: "*Mens quidem erat de Morbis Monialium, & curatione differere; sed satius duxi, Dissertationem hanc de illarum tuenda Valetudine præmittere, longe gloriosius esse existimans a morbis præservare, quam eosdem curare*" (the intention was undoubtedly to take into account illnesses and care of nuns, but I thought it would be preferable to include an essay on the protection of their health, believing that it is more convenient to prevent diseases than to treat them) (19).



Atque hæc quidem ad Therapejiam,
modo pauca quædam documenta pro hu-
jus meæ prælectionis coronide, in pro-
phylaxeos gratiam lubet proponere, quan-
do longe præstantius est præservare, quam
curare, sicuti satius est tempestatem præ-
videre, ac illam effugere, quam ab ipsa
evadere. Cum igitur boves ab agris post

Figure 1 - The Latin text of Ramazzini's expression "far better to prevent than to cure" included in the XIII oration (from the 1739 edition of the *Opera Omnia*)

RINDERPEST EPIDEMIC AND COVID-19 PANDEMIC SHARE MANY SIMILAR ASPECTS AND CHALLENGES

In the light of the actual situation causing profound concern about people health and countries economy, I provide some reflections on this challenging issue by acknowledging some differences and many similarities with Ramazzini's XIII oration. Although it can be difficult and sometimes misleading to analyse phenomena observed in different times, the comparison between the present and the past could stimulate and encourage cultural and social reflections. Therefore, this comparison could provide not only elements of curiosity but rather bricks suitable for producing new intellectual advancements. Various crucial points are shared by the current COVID-19 pandemic and the rinderpest epidemic outlined in the oration. First, the concern about human health impact. There is no evidence that the rinderpest virus symptomatically infected humans (13, 15), although at that time the oration did not completely exclude the possibility of infecting humans. On the contrary, the current emergency raises deep concern for people's health. Second, the worldwide diffusion of COVID-19. Considerable efforts are being made to determine virus transmissibility and to implement effective contrast measures. Similar efforts were made on the occasion of the livestock epidemic. Those efforts impacted on the evolution of transmissibility concepts and highlighted the urgency of contrasting the disease (13). Third, rinderpest epidemic and COVID-19 pandemic involve a similar concern as to economic and social factors. While world economies are dramatically hit by the COVID-19 pandemic, the livestock epidemic varied in intensity and duration from region to region. The XIII oration describes how the infection threatened the economies of the Venetian Republic and other Po valley states in the eighteenth century. In successive decades, recurring rinderpest epidemic outbreaks retarded economic development and increased poverty and malnutrition in European and African countries (13, 15). Fourth, treatment. COVID-19 infected people are treated with a mix of antiviral drugs. Also the well-known antimalarial drug (chloroquine) has been suggested for prophylaxis (18) and treatment

(4). Curiously, Ramazzini supported the treatment of rinderpest with quinine. He acknowledged that, other than its real and proven effectiveness, nothing was known of cinchona bark ("*the peruviano febrifugo ... nobis divinitus concesso*") (6, 24) and remarked that at times it caused complications in the patient taking it, especially over a long period (25). After many years, quinine would have been used for malaria chemoprophylaxis (27). Fifth, the preventive measures. Rinderpest has been the first infectious disease successfully controlled by active intervention (13). These measures included restriction of animal movement, isolation, disinfection and destruction. Currently, similar interventions including lockdown and social distancing measures are being implemented to fight COVID-19. Sixth, the need for a multidisciplinary expertise. Just as the current task forces include a variety of expertise in the medical, technical, scientific, and managerial fields, it should be mentioned that the team guided by Ramazzini included medical and non-medical experts, in particular veterinaries. Seventh, the relevance and timeliness of decisions on prevention measures. During the rinderpest outbreak in the Republic of Venice, the authorities gave the commission a comprehensive mandate to study the problem and devise a solution. Within a short time, the commission produced a trustworthy document. Just as quickly, the Republic established infection prevention and control measures. In the same way, the fight against COVID-19 is currently based on reliable data and on timeliness of decision-making.

In conclusion, a similar approach is shared by both the 1711 rinderpest epidemic and the current emergency, although some uncertainties in addressing the COVID-19 pandemic currently exist (7). Most preventive measures adopted in both events prove the need for a scientific approach and relevant initiatives in guiding a correct public health strategy based on continuing surveillance, risk mitigation and containment of transmission. The strategy to the global eradication of rinderpest is regarded as a history of success (13). Consequently, the rinderpest example should challenge the current generation of scientists to view COVID-19 eradication as the ultimate means of control and prevention.

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