EDITORIAL

Anthrax— A worldwide, regional and national disease of public health of importance

ML Mazaba

Editor-in-Chief, *The Health Press- Zambia*, Zambia National Public Health Institute, Lusaka, Zambia

Anthrax has a long history in public health from ancient times to the present. It is a zoonotic disease caused by the gram-positive spore-forming bacterium *Bacillus anthracis* primarily affecting domestic and wild herbivores including cattle, sheep, goats, bison, deer, antelope and hippos among others [1]. Although primarily an animal disease, it is transmissible to human beings. Human to human transmission is very rare. A literature review on the history of major anthrax outbreaks globally indicates serious losses among animals including one that is believed to have killed 40,000 horses and 100,000 cattle herded by the Huns as they trekked across Eurasia, another in the 14th century in Germany, and one in the 17th century that killed over 60,000 cattle in Europe [2]. Although controlled in some regions such as the United States of America and Canada, anthrax is distributed globally and more commonly enzootic in sub-Saharan Africa, Asia and Central and South America [3]. Although a rare infection among humans, anthrax continues to be a disease of public health concern despite a vaccine being available. In 2016, multiple outbreaks were documented: an outbreak among reindeer occurred in Siberia affecting dozens of persons, several outbreaks in Kenya affected animals and humans including an outbreak in Nakura associated with contact with infected buffalos [4]; another affecting over 70 persons in Maragua and Sanbura counties associated with anthrax-infected cattle, sheep and zebra. Human fatalities were recorded including a 73-year-old in Maragua and 7-year-old in Sanbura who tested positive for anthrax. Several animals that were ill or died tested positive for anthrax infection [5]. Other outbreaks in 2016 were reported in Shirajganj, Bangladesh affecting up to 125 persons associated with eating meat from anthrax-infected animals [6]. Up to six human fatalities linked with eating anthrax-infected beef in the Niger Republic were reported in October 2016 [7]. In France, anthrax outbreaks were found among sheep and cattle while in northeastern Bulgaria, only were affected with four fatalities among the animals. The outbreak in north-eastern Bulgaria could be linked to the

2015 outbreak that affected both humans and animals [8]. Zambia experienced two outbreaks in 2016 affecting over 80 persons and 20 animals in Chama district in Muchinga province and dozens of people and animals in four districts, namely Shang'ombo, Nalolo, Limulunga and Kalabo of Western province. In both outbreaks, infections among humans was associated with infections in hippos and buffalos in the former and dozens of cattle in Western province [9]. The outbreak in Western province is still ongoing in 2017 but under control with animals being vaccinated and patients being given medical treatment. A cumulative total of 67 persons (with one fatality) and dozens of animals are affected [10]. All outbreaks among humans have been associated with contact with or consumption of anthrax-infected meat.

The natural transmission of anthrax to humans from the natural hosts, wild and domestic animals, is through direct or indirect contact with carcasses of animals that died from anthrax; consumption of meat from infected animals; or inhalation of spores aerosolized during work with contaminated materials such as animal hides and wool. However, infection has also resulted from inhalation through acts of bioterrorism [11]. Quite recently, an emerging form of anthrax infection is injection anthrax among injection drug users [12]. Since 2009, cases of injection anthrax have been reported from Denmark, France, Germany and the United Kingdom. Berger et al. [13], who reviewed reporting systems until through December 2013, reported 70 confirmed cases with 26 fatalities (case fatality rate = 37%).

Natural anthrax infections occur in three forms including lung (pneumonia), skin (cutaneous) and intestinal anthrax. Cutaneous anthrax is the most common (>95%) form of naturally occurring anthrax among humans [14]. The common characteristic of cutaneous anthrax is a black eschar on the skin of an infected person, hence the name anthrax derived from the Greek word *anthrakos* meaning coal [15]. In 2001, several media offices and two United States senators were exposed to anthrax spores sent through the post leading to 17 infections and five deaths [16]. Lung anthrax most often occurs as a result of a bioterrorism act, when anthrax spores are inhaled. In 1979, the largest outbreak of human inhalation anthrax ever documented occurred in Sverdlovsk near a Soviet military microbiology facility [17]. Intestinal anthrax occurs after ingestion of undercooked anthrax-infected meat [1].

Although control and awareness programs are being implemented in most countries, there is a need for a "one health" approach to prevent and control further outbreaks. There is a need for authorities to address the connections between anthrax outbreaks, environmental concerns, and food insecurity.

References

1.Communicable Disease Prevention and Control. San Francisco department of Public Health. Anthrax (Bacillus anthracis). URL http://www.sfcdcp.org/anthrax.html.

2.Knights EM. Anthrax. URL http://www.historymagazine.com/anthrax.html.
3.World Organization for Animal Health, World Health Organization, Food and Agriculture Organization of the United Nations. Anthrax in humans and animals. 4th edition. World Health Organization, 2008. URL: http://www.who.int/csr/resources/publications/anthrax_web.pdf.
4.Zwizwai R. Infectious disease surveillance update. Lancet Infect Dis. 2016;16:901.
5.ProMED. PRO/AH/EDR> Anthrax, human, livestock, wildlife - Kenya (Maragua, Samburu). Archive Number: 20060104.0026. Published 4 January 2006. URL: http://www.promedmail.org/post/20060104.0026
6.Herriman R. Bangladesh: 125 anthrax cases reported in Sirajganj. URL: http://outbreaknewstoday.com/bangladesh-125-anthraxcases-reported-in-sirajganj-74475/.
7.Herriman R. Anthrax in animals prompts warning in Nigeria, Zambia. URL: http://outbreaknewstoday.com/anthrax-in-animalsprompts-warning-in-nigeria-zambia-85670/.
8.Herriman R. Anthrax kills four animals in north-eastern Bulgaria. http://outbreaknewstoday.com/anthrax-killsfour-animals-in-northeastern-bulgaria-99973/.
9.Herriman R. Anthrax outbreak linked to tainted hippo meat more than doubles in Zambia. URL: http://outbreaknewstoday.com/anthrax-outbreak-linkedto-tainted-hippo-meat-more-than-doubles-in-zambia26869/.
10.Mwambi P. Anthrax outbreak in Muchinga. Unpublished report submitted to the World Health Organization: Lusaka, Zambia, 25 October 2016.
11.Shadomy SV, Traxler RM, Marston CK. Anthrax. URL: https://wwwnc.cdc.gov/travel/yellowbook/2016/infectious-diseases-related-to-travel/anthrax.
12.Centers for Disease Control and Prevention. Injection anthrax. URL: https://www.cdc.gov/anthrax/basics/types/injection.html
13.Berger T, Kassirer M, Aran AA. Injectional anthrax - new presentation of an old disease. Euro Surveill. 2014;19.pii=20877.
14.Centers for Disease Control and Prevention. Epidemiology and Prevention of Vaccine-Preventable Diseases. Atkinson W, Wolfe S, Hamborsky J, McIntyre L, eds. 11th ed. Washington DC: Public Health Foundation, 2009.
15.Turnbull PC. Introduction: anthrax history, disease and ecology. Curr Top Microbiol Immunol. 2002;271:1-19.
16.Jernigan DB, Raghunathan PL, Bell BP, Brechnert R, Bresnitz EA, Butler JC, et al. Investigation of bioterrorism-related anthrax, United States, 2001: epidemiologic findings. Emerg Infect Dis. 2002;8:1019-28.
17.Stembach G. The history of anthrax. J Emerg Med. 2003;24:463–7.