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Case Report

Infection with MRSA CC398 Related to Occupational Exposure to Mink: A Case Report

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Abstract

A 59-year old man was hospitalised with dyspnoea, cough and fever, which led to respiratory treatment, later complicated with large central pulmonary embolisms. The only positive finding in samples was MRSA CC398. The patient worked several times as a full-time employee at a mink farm, which was the only exposure to MRSA CC398 in the patient's occupational history. The Danish Labour Market Insurance recognised the injury as an occupational disease; hence, exposure to LA-MRSA for working on mink farms is a new occupational risk factor in Denmark.

Keywords: MRSA CC398; LA-MRSA; Methicillin resistant Staphylococcus Aureus; Mink; Pigs; Livestock; Infection; Occupational disease; Work; Exposure

1. Introduction

In Europe, Clonal Complex (CC) 398 (livestock associated methicillin resistant staphylococcus aureus) is the dominant LA-MRSA genotype. In Denmark, the first cases of LA-MRSA were reported in humans in 2004 and since the number of cases has been increasing and LA-MRSA is now the predominant type. Most people carrying MRSA CC398, have direct contact to livestock predominantly pigs or are household members to people with livestock contact. LA-MRSA is widespread in the Danish pig population with a herd prevalence of around 90 % in 2016, whereas this bacterium is only found at a very low frequency in the Danish mink population. LA-MRSA belonging to CC398 was first detected in mink in clinical samples submitted to the National Veterinary Institute (DTU-VET) during 2013, but from then on, the bacterium has been found in several samples from mink investigated at DTU-VET. Later, in 2015 sample types including paws and pharyngeal swabs from healthy mink were collected

at pelting in 50 Danish mink farms. LA-MRSA was found in healthy animals on 40% of the investigated farms [1]. In 2017 a study in 5 Danish mink farms found LA-MRSA in samples from mink carcasses in 4 out of 5 mink farms. On farms with LA-MRSA positive animals, the animal prevalence of LA-MRSA ranged from 20% to 29%. LA-MRSA was also isolated from the environment, including cages, but not in air samples [2].

2. Case Report

A 59-year old man, previously healthy apart from congestive heart failure, was hospitalised in April 2016 with dyspnoea, cough and fever. The patient received respirator treatment for approximately five weeks due to increasingly insufficient respiration. Simultaneously the patient was treated with antibiotics including Vancomycin. During hospitalisation several samples were obtained from sputum, nose, trachea and perineum, and submitted to microbiological analysis. The only positive finding was MRSA CC398 in samples from nose, trachea, perineum and sputum. Subsequently the patient underwent rehabilitation and was discharged, but owing to a sudden development of dyspnoea the patient was readmitted at hospital short after the discharge. CT scanning of thorax showed large central pulmonary embolisms. The patient was after discharge repeatedly tested positive with MRSA CC398 and was treated with eradication. Nine months after the first hospitalisation there were no longer positive MRSA CC398 findings in samples from nose, trachea or perineum.

The patient was examined by a doctor in occupational medicine as part of the industrial injury case. The occupational history revealed that the patient worked several times as a full-time employee at a mink farm in the period from 2001 to 2014. There were 25.000 mink at the farm and 3000 after pelting. None of the animals were tested for MRSA CC398. The son of the owner of the mink farm, who randomly worked at the farm, was repeatedly tested positive to MRSA CC398. There were no other exposure to MRSA CC398 in the patient's occupational history. The assignments included feeding with a mixture of fish waste and waste from pig slaughterhouses, cleaning of the feed silo and scraping off old feed from the cages. Furthermore, two-month-old mink were moved from cage to cage and mink were captured in the cages and put down in a killing cart by means of exhaust gas from cars. In shorter periods, the assignments included hanging the pelts to dry. The patient was granted an early retirement benefit due to the consequences of the industrial injury. The Danish Labour Market Insurance recognised the injury as an occupational disease and the patient was entitled to compensation. His ability to work had been reduced with 90%. The degree of invalidity has not yet been decided.

3. Discussion and Conclusions

Exposure to LA-MRSA for working on mink farms is a new occupational risk factor in Denmark. In 2016 the Danish Health Authority introduced working on mink farms or being a household member of a person who has worked on mink farms as a special high-risk situation for MRSA [4]. Denmark produces 17 mio. mink pelts/year has a leading position in the world. There are 1400 mink farms and more than 6000 Danes work in the mink industry and thus representing a substantial reservoir for LA-MRSA, both in animal and human. Mink are fed 1-2 times a day and feed contains slaughter offal from the pig industry, fish, corn products and plant protein. The feed is delivered

every to every other day in fresh condition [5, 6]. In mink farms, contaminated feed is regarded as the most likely source of LA-MRSA. In mink, LA-MRSA is primarily isolated from paws and pharynx, and therefore poses a public health hazard to mink farmers if exposed to colonized animals through bites and scratches or contaminated environmental sites [3]. The increasing risk of being exposed to LA-MRSA in not only the pig industry, but also the mink industry, underline the importance of health personal to ask patients about their occupational exposure to livestock-animals when relevant. Infection with LA-MRSA is often an occupational disease and doctors are obligated to notify the Danish Labour Market Insurance if an occupational disease is suspected.

Conflicts of Interest

The authors declare no conflicts of interest.

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