Multi abscessation with multinodular abscesses in a New Zealand white rabbit (Oryctolagus cuniculus) following Arcanobacterium pyogenes infection

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SUMMARY

Arcanobacterial infections can be seen in different animal species (cattle, pig, turkeys) but more rarely in rabbits. A female New Zealand white rabbit from a laboratory animal husbandry presented painful large masses on the right flank and around sternum coupled to gradual deterioration of the body condition. After euthanasia and necropsy, the presence of large abscesses containing yellow liquid pus enriched with cell debris was confirmed and congestion eventually coupled to small necrotic foci was also seen in internal organs (liver, spleen, lung and brain). The causative agent was microbiologically identified as Arcanobacterium pyogenes and it was the first description of multinodular abscessation due to this germ in rabbits.

Key-words: Rabbit, Arcanobacterium pyogenes, multi-abscessation, liquid pus, general congestion.

Introduction

Arcanobacterium pyogenes is a Gram positive, non-motile, non-spore forming, short rod, opportunistic pathogenic bacterium that is a normal inhabitant of the mucous membranes in upper respiratory tract and genital tracts of several animal species [24]. It causes liver abscesses in feedlot cattle [16], pneumonia [8], gastritis [21] and arthritis in pigs [10] and osteomyelitis in turkeys [3]. Infection is autogenous normally [17]. Although the bacterium is capable of acting as a primary pathogen, infection often follows a physical or microbial trauma to the mucous membranes [20]. It is also causative agent of summer mastitis in cows and heifers and abortion in dairy cattle [15, 18]. Arcanobacterium pyogenes is also commonly found in bovine rumen [17] and can be isolated from the porcine stomach [12]. Other clinical signs of the infection are endocarditis, metritis and vesiculitis [14]. Arcanobacterium pyogenes is a particularly versatile pathogen that is able to cause illness in a multitude of different animal species. It is an infrequent pathogen of human beings [6].

Adherence to host mucosal surfaces is a prerequisite for infection and two neuraminidases, NanH and NanP, are important factor which help the adherence of the organism to host epithelial cells [11, 12]. Other virulent factors are cholesterol-dependent cytolysin (pyolysin), extracellular matrix-binding proteins, collagen-binding protein, fibrinogen and fibronectin binding protein and DNases and proteases [9].

The present report describes clinical and pathological findings in a New Zealand white rabbit with disseminated multinodular abscessation due to infection with Arcanobacterium pyogenes.

Case Report

CLINICAL STORY

A female New Zealand white rabbit was noticed in the Lab animal husbandry of Tabriz University, Faculty of veterinary medicine, with problematic movement, disability to compete
for food and of debilitating body condition day by day for around 60 days. It had not prior antecedent injection. In clinical exams two painful masses were palpated, one on the right flank and one on the chest midline around sternum. All mammary glands were normal. After some days body was completely asymmetric from midline (figure 1). A malodorous dark yellow liquid exudate with numerous solid tissue debris and clots had been drained from the abscess around sternum.

The rabbit was euthanized with Sodium thiopental because of severe pain, disability to move and deteriorated body condition. Necropsy was immediately performed.

**Necropsy Findings**

The body was emaciated and was in poor condition. Two large masses were in front of the stifle joint on the right flank of the animal and one was around sternum. All masses contained nodular yellow watery pus and debris (figure 2). Two of the abscesses were multinodular. They were very large with 2.5-3.0 cm length.

Liver was hyperaemic and presented some small repaired necrotic foci (figure 3). Congestion was also observed in both renal medulla and cortex but no any abnormality was found in urinary bladder. Spleen also was hyperaemic. Diaphragmatic lobe in lung was hyperaemic and a slight pneumonia was noted whereas bronchi and bronchioles were intact. The heart was partly flaccid and showed serous atrophy of the fat deposits on the base. Fat depots and subcutaneous fat reserves were moderately atrophic. Brain was moderately oedematous. No lesion was noticed in the gastrointestinal tract.

**Histopathology**

For histopathology analysis, tissues were sampled in 10% neutral buffered formalin and were routinely
ARCANOBACTERIAL MULTI-ABSCESSATION IN A RABBIT

The blood and liver cultures showed no bacteria. A. Arcanobacterium pyogenes and Corynebacterium A. Pasteurella multocida usually arise from open -bacteria [22]. One clinical Streptococcus C. Arcanobacterium pyogenes Fusiformis neeroplzorus A. B. ad libitum identification of isolates. Again the bacterium growth was oxidation-fermentation, were operated and confirmed the maltose, mannitol, sucrose or xylose fermentation, reduction, esculin, gelatine hydrolysis, urease production, routine biochemical tests, including catalase, oxidase, nitrate cocci-rod-shaped in the microscopic examination. Other that were beta haemolytic, Gram positive and small curved zone. Pure cultures of isolates were prepared from the colonies somehow long time to observe the colonies (7 days). Colonies were small, circular, convex and opalescent with smooth glistening and surrounded with a narrow sharp haemolytic zone. Pure cultures of isolates were prepared from the colonies that were beta haemolytic, Gram positive and small curved coci-rod-shaped in the microscopic examination. Other routine biochemical tests, including catalase, oxidase, nitrate reduction, esculin, gelatine hydrolysis, urease production, maltose, mannitol, sucrose or xylose fermentation, oxidation-fermentation, were operated and confirmed the identification of isolates. Again the bacterium growth was slow and the development in differential mediums took 10 days. Taking into consideration the growth and biochemical traits [2], isolates were identified as Arcanobacterium pyogenes. The blood and liver cultures showed no bacteria.

Discussion

A variety of abscesses due to micro-organisms such as Corynebacterium pseudotuberculosis, Arcanobacterium pyogenes, Escherichia coli, Staphylococcus and Streptococcus spp [19] have been isolated in animals. Abscesses due to Arcanobacterium pyogenes usually arise from open wounds, aura puncture wounds or abrasions of the skin [7, 19]. Abscesses can be formed in nearly any organ of the body, but mainly in skin and bone [19]. The most common causes of rabbit abscesses are infected traumatic bite wounds especially tooth root and tear duct infections. However, in this case no wound was found on the body from the time of abscess discovery but of course not before that. In addition, the environmental condition of lab animal husbandry was good and food was available ad libitum.

Specifically in rabbits, abscesses can be caused by a wide variety of bacteria including Pasteurella multocida, Streptococcus spp, Pseudomonas spp and Staphylococcus spp. However, Pasteurella bacteria are more common compared to the others [4]. Usually, liquid pus was rarely formed in rabbits [23], but in this case the pus was completely liquid. According to our knowledge there are no documented data on multi abscessation with multinodular abscesses in New Zealand white rabbits caused by Arcanobacterium pyogenes. Differential diagnosis should be done with Schmorl’s disease caused by Fusiformis necrophorus bacteria [22]. One clinical expression of the disease consists in thick-walled abscesses containing yellow pus, which are extremely painful with palpation. These abscesses form in the skin or in the internal organs, and may reach the size of a golf ball [22]. The other terms of differential diagnosis is cysts. Abscesses in this case were hot and painful with palpation, as opposed to cysts which are not hot and the palpation causes no pain.

Splenetic hyperaemia is common in septicaemias as spleen is an important part of immune system to clear the blood from bacteria with its red pulp macrophages. Reactivity of white pulp is related to lymphocyte activation and mitoses show the antigenic irritation due to bacteria or any other sources [5]. Generalized congestion can evoke heart weakness that is a consequence of vast release of inflammatory mediators like tumour necrotic factor from various tissue sources [1]. This suggests a severe immune response, although any bacterial colonies were found in blood or liver sample cultures. It also shows that the animal was in a septicaemia situation before death. Necrotic foci of liver were completely repaired with fibrous connective tissue that is a sign of oldness of the foci. No relation between them and bacterial infection was directly found in the case report.
Arcanobacterium pyogenes is an established but often unrecognized human and animal pathogen. Some cases of human infection have been reported recently, most of them were in close contact with animals [13]. The bacterium should be noticed more as a causative agent of human and animal bacterial infections, as demonstrated by the present case.

References