Oerskovia spp. Infection in a Pigeon - Case report and Review

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KEYWORDS

Oerskovia spp., avian, granuloma.

SUMMARY

A case of an adult domestic pigeon with clinical signs of watery diarrhoea, anorexia and lethargy. At necropsy a caseous peri-oesophageal mass was found. Histological examination revealed a granulomatous mass with multinucleated giant cells and gram-positive rods and cocci. Bacteriological culture from this mass and from small and large intestine detected a mixed infection of Oerskovia spp. and α-haemolytic Staphylococci. This is the first report of Oerskovia spp. in a bird.

INTRODUCTION

Bacteria of the Oerskovia genus form part of the normal commensal bowel flora in man. They also occur as saprophytic organisms in soil, decaying plant material, brewery sewage and aluminium hydroxide gels. Rarely, they are associated with disease in human patients. Similarly, in the veterinary literature there is only one report of infection associated with isolation of Oerskovia spp. This occurred in an aborted equine foetus. This case report describes a thoracic mass in a pigeon from which Oerskovia spp. were isolated. The infection of a bird with Oerskovia spp. has not, to our knowledge, been previously reported.

HISTORY

Two pigeons out of a flock of 40 adults were found within a week’s interval with watery diarrhoea, anorexia and lethargy. The first bird was euthanised without further examination. However, the second pigeon was submitted for necropsy to the Department of Veterinary Pathology, University of Liverpool. Macroscopically, the bird was in good body condition. A firm, white, caseous nodular mass (11mm in diameter) was present at the base of the heart adjacent to the oesophagus and trachea. The liver was enlarged and light brown with white speckling of the capsular surface. All other organs were unremarkable.

Following bacterial culture of the caseous mass and small and large intestines, mixed cultures of Oerskovia spp. and α-haemolytic Staphylococci were isolated in these organs. Oerskovia spp. were cultured from the mass in Robertson’s cooked meat broth (aerobically and anaerobically) and on conventional blood agar (aerobically) and were also cultured from intestinal samples on conventional blood agar (aerobically). They were identified by the API-system (bioMerieux sa, 69280 Marcy-l’Etoile, France) at genus level, while species level identification was not carried out at that time. Oerskovia spp. were sensitive to the antibiotics Ampicillin, Augmentin, Cephalexin and Gentamicin. Later attempts to re-isolate the organism from other birds of the flock in order to identify the bacterium to species level were unsuccessful. Other organisms were neither cultured from the mass nor from intestine or liver. In addition, there was no evidence of endoparasitism.

Tissue samples were fixed in 10% formalin and embedded in paraffin wax. Tissue sections (4µm) were then stained with Haematoxylin-Eosin (H.E.) or Gram stain and examined by light microscopy. The histological examination of the thoracic mass revealed multiple granulomatous coalescing cellular nodules comprising peripheral viable and necrotic lymphocytes, macrophages and degranulated heterophils with central caseous necrosis (Figure 1). There were occasional multinucleated giant cells at the periphery of some nodules (Figure 1A) and focal bacterial colonies of gram-positive rods (Figure 2). Towards the edge of the mass granulated heterophils and granulation tissue were present. Inflammation extended into the surrounding adipose tissue with associated lymphoid follicular proliferation. The lamina propria of the oesophageal contained an extensive inflammatory infiltrate of predominantly heterophils with fewer lymphocytes and macrophages, extending
into the tunica muscularis (Figure 3). Some bacterial colonies were on the surface epithelium, but were not observed within the oesophageal wall. The liver had randomly distributed perivascular heterophilic infiltrates, which extended into the parenchyma.

**DISCUSSION**

In 1938, Oerskov isolated microbial organisms from soil and described them as *Nocardia*-like bacteria\(^ {17}\). Later they were characterized by Erikson (1954) and became designated as *Nocardia turbata* n.sp.\(^ {5}\). However, unlike true *Nocardia* species, which produce white powdery colonies of branching filaments with an aerial mycelium on nutrient agar, *Oerskovia* spp. grow as yellow-pigmented, smooth glistening colonies without development of an aerial mycelium. They consist of irregular extensively branching hyphae, and in contrast to true *Nocardia*, *Oerskovia* spp. fragment into motile rods (first monotrichous, later peritrichous). *Oerskovia* spp. are facultative anaerobic, gram-positive, non-acid fast bacteria, catalase positive and fermentative and contain large amounts of galactose in their cell wall\(^ {7}\). These properties, discovered by Prauser (1970) and Sukapure et al. (1970), led to the proposal of the new genus *Oerskovia* in the class of *Actinomycetales*\(^ {19,22}\). In addition to *Oerskovia turbata*, a second species, *O. xanthineolytica*, was identified by Lechevalier\(^ {13}\) who isolated it from soil, organic matter and aluminium hydroxide gel. The most important biochemical difference between both species lies in the hydrolysis of xanthine and hypoxanthine (positive in *O. xanthineolytica*, negative in *O. turbata*)\(^ {7}\). Lechevalier also isolated several strains of non-motile oerskovia-like organisms (NMO), which resemble motile *Oerskovia* on chemotaxonomy and morphology but *Cellulomonas* biochemically due to the ability of cellulolysis\(^ {12}\).
Oerskovia spp. are distributed ubiquitously in the environment and since 1979 there have been 16 reported cases of clinical infections with Oerskovia spp. in man. Most of these have been associated with foreign bodies including indwelling venous or peritoneal catheters, heart valve transplants, bone marrow transplant, prosthetic joints or traumatizing intraocular metallic objects. There are no fatalities described in the literature, despite the fact that most cases have occurred in immunocompromised patients.

The one report of Oerskovia spp. infection in veterinary literature is from an aborted foal, which had chronic placentitis and severe diffuse granulomatous pneumonia. The latter was characterised by consolidation of the alveoli by macrophages, some neutrophils and occasional large multinucleated giant cells. Gram-stains of these lesions revealed pleomorphic gram-positive bacilli within macrophages. Pure cultures of O. xanthineolytica were obtained from lung and stomach.

The lesion described in our case was also granulomatous, although a mixed infection of α-haemolytic Staphylococi and Oerskovia spp. was present. Therefore, the contributing role of each organism and possible synergistic effects have to be considered. Truant et al. reported a case of a patient who developed methicillin-resistant Staphylococcus aureus bacteraemia, which was complicated by a secondary O. xanthineolytica bacteraemia. As some Oerskovia spp. release a sialidase enzyme which destroys glycoproteins, glycolipids, gangliosides and mucins, this could conceivably lead to a synergistic tissue-damaging effect in mixed infections. In addition, as Oerskovia spp. are facultative pathogenic organisms, underlying causes of disease such as immunosuppression or a contaminated foreign body should be sought in cases of Oerskovia infection. In our case, based on the site of the granulomatous lesion between trachea and oesophagus and focal oesophagitis, we cannot rule out a transient penetration of oesophageal foreign body as the underlying cause.

In conclusion, this case is the second report in veterinary literature, indicating the possible role of Oerskovia spp. in disease of domestic animals. It is also worth bearing in mind, that Oerskovia spp. appear to have high resistance to antibiotics. In an outbreak of vancomycin-resistant enterococci in a hospital in London isolates of O. turbata were found, containing plasmids that encoded genes resembling vanA of the vancomycin-resistant enterococci. The extreme rarity of vancomycin resistance in Oerskovia species suggests that genes were transferred from vanA enterococci. In our case Oerskovia spp. were resistant to a variety of antibiotic drugs (Clindamycin, Cotrimoxazole, Enrofloxacin and Oxytetracyclin). As there are an increasing number of reports describing broad-spectrum resistance of microbial organisms, it is possible that infections with opportunistic pathogens such as Oerskovia spp. may increasingly play a role in mixed bacterial infections of susceptible individuals.

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**REFERENCES**


