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OSTEOMYELITIS AND ARTHRITIS CAUSED BY *Salmonella typhimurium* IN A CROW

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Abstract: *Salmonella typhimurium* was isolated from an arthritic elbow joint of a crow (*Corvus brachyrhynchos*) which also had bilateral osteomyelitis of proximal tibiae. The prevalence of *Salmonella* organisms in wild birds is reviewed briefly.

INTRODUCTION

The genus *Salmonella* is comprised of host-specific and nonhost-specific types. Control programs have been particularly successful at decreasing the prevalence of infections with host-specific salmonellae, such as *S. typhi* in man and *S. pullorum* and *S. gallinarum* in domestic poultry, because of the relatively limited number of ways in which these types can be transmitted.^{2,7} Nonhost-specific types, on the other hand, are widely distributed throughout the world, *S. typhimurium* being most commonly isolated.^{2,8,9} Nonhost-specific salmonellae have been isolated from a wide variety of wild animals, but the prevalence of infection in various populations of wild animals appears to reflect the degree of contamination of the environment by populations of humans and domestic animals.^{4,5,7,10}

The present report describes lesions of osteomyelitis and arthritis caused by *S. typhimurium* in a common crow (*Corvus brachyrhynchos*).

CASE HISTORY AND METHODS

On 25 June 1977, a crow incapable of flight was found in a park in Saskatoon, Saskatchewan, and was submitted to the Western College of Veterinary Medicine. Clinical examination revealed a marked swelling of the right humero-radio-ulnar

(elbow) joint. The bird was euthanized and submitted for necropsy. On macroscopic examination, the bird was in good body condition; the absence of readily identifiable gonads suggested that it was a juvenile. Two milliliters of cloudy, viscous, yellowish fluid were extracted aseptically from the swollen right elbow joint, and culture of this fluid on MacConkey agar at 37 C yielded a pure isolate of *Salmonella* species, later identified as *Salmonella typhimurium* (serotype 4,5,12:i:1,2; phage type 160).[□] The proximal portion of the right tibia was much larger than the left and contained dry caseous material; no growth of bacteria was obtained from aerobic culture of this material on blood and MacConkey agars at 37 C.

Microscopic lesions were confined to the skeletal system and the spleen, the latter showing exhaustion of lymphoid follicles and large numbers of plasma cells in the red pulp. The capsule of the right elbow joint was infiltrated by numerous heterophils, mononuclear cells and fibroblasts, and the inflammatory reaction extended into the subcutaneous tissue. The humeral and ulnar articular cartilages had slight hyalin degeneration and were covered in a few places with cellular debris. A large area of cartilaginous tissue in the olecranon was necrotic and surrounded by mononuclear inflammatory cells and

[□] National Enteric Reference Center, L.C.D.C., Ottawa, Ontario K1A 0K9, Canada

fibroblasts. Proximal portions of both tibias contained a large area of caseation necrosis (Fig. 1) which included trabeculae of dead cartilaginous tissue and was surrounded by numerous mononuclear cells, heterophils and fibroblasts. No growth plate was seen in the proximal portion of either bone. Numerous small Gram-negative rods were evident in the right olecranon and in both tibias.

DISCUSSION

The diagnosis made was chronic arthritis and multifocal osteomyelitis due to *S. typhimurium*. The bird probably had suffered a septicemia or bacteremia from which it had recovered except for localization of the microorganisms in certain parts of the skeletal system.



FIGURE 1. Proximal portion of left tibia showing a well defined area of necrosis which contains trabeculae of dead cartilaginous tissue in its lower half. Gram stain $\times 4$

Nairn⁶ discussed the reasons for the localization of systemic bacterial infections to the growth plates of long bones of growing turkeys, and he claimed that osteomyelitis could not be induced experimentally once these had closed at maturity. Synovial membranes of joints also are a favored site of localization of bacteria because of their abundant blood supply, but Nairn⁶ suggested that infection of a joint often may result from an adjacent bone lesion. In the present case, the trabeculae of dead cartilaginous tissue seen within necrotic foci in both tibias probably represented columns of cartilage which had been sequestered at the time the infection localized in the metaphyses. However, the infectious process did not seem to have significantly affected the closure of the growth plates or the shapes of the bones or of their articular surfaces.

A number of studies involving various species of wild birds have revealed a low prevalence of *Salmonella* infection (intestinal carriers), of the order of 0.1 to 2%, with most isolations being made from birds living in colonies.⁸ Other studies have illustrated the influence of environmental contamination on the prevalence of infection in wild birds, this prevalence reaching 31% in some cases.¹⁰ Outbreaks of salmonellosis in wild animals seem to have been reported only in birds, and these were mostly in passerine birds concentrated in winter around food supplied by man.^{3,11,12} Lesions were most often of an acute nature, including congestion of major viscera and ulcerations of gastrointestinal tract, but more chronic lesions such as multiple abscesses were also described. Brunett¹ described lesions of arthritis caused by a *Salmonella* sp. in a commercial flock of pigeons.

The present case appears to have been an isolated one, and the fact that it occurred in early summer, when crows and other birds are dispersed, may have limited the spread of infection.

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