



## Growing Significance of Cat Scratch Disease as an Emerging Zoonosis

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Since antiquity the human beings are intimately linked with animals. Various types of animals, such as rabbit, chinchilla, ferret, hamster, guinea pig, rat, mice, gerbil, squirrel, deer, monkey, dog, cat, parrot, pigeon, fowl, budgerigar, canary, turtle, tortoise, fresh water fish, salt water fish, snake, lizard etc. are kept as pets. However, the dogs and cats are the most common types of pets, and are considered as family members by sharing the environment. The pet population in India is estimated over 15 million in 2016. The number of pet cats is projected 70 million and 47 million in USA and Europe, respectively. It is thought that African wild cats were probably domesticated in Middle East about 10,000 years before. The domestic cat (*Felis catus*) is a small carnivorous mammal, which belongs to the genus *Felis* and family *Felidae*; and they share the same environment where humans breathe. The close contact of cat with humans may pose a risk of transmission of many zoonotic infections of multiple etiologies, which include viruses, bacteria, fungi, protozoa, and helminths. There are many cat zoonoses, such as dermatophytosis, sporotrichosis, pasteurellosis, toxoplasmosis, pasteurellosis, cat scratch fever, rabies, cow pox, tularaemia, coxiellosis, plague, salmonellosis, campylobacteriosis, yersiniosis, leptospirosis, *Staphylococcus intermedius* infection, leishmaniasis, cryptosporidiosis, giardiasis, Chagas disease, paragonimiasis, capnocytophagosis, and cheyletiellosis, which may be transmitted via several routes to human beings. Among several cat associated zoonoses, cat scratch disease (bacillary angiomatosis, bartonellosis, cat scratch fever, lymphoreticulosis benign, regional granulomatous lymphadenitis), is an emerging bacterial zoonosis of worldwide significance. The credit goes to Henri Parinaud who gave the first description of disease in 1889. However, the first successful isolation of bacterium was attempted by English and co-investigators. In recent years, cat scratch disease has been recognized as an important global public health problem. Disease is caused by *Bartonella henselae*, is a Gram negative, fastidious, rod shaped, curved, pleomorphic, hemotropic, oxidase negative, intracellular bacterium. The pathogen occurs as commensally in the oral cavity of cat less than 1 year of age. Researchers reported that bacterium is maintained and spread among cats by cat flea (*Ctenocephalides felis*). The organisms are excreted in the feces of the cat flea, which serves as vector for the transmission of *Bartonella henselae* among cats. It is pertinent to mention that approximately 40% of all cats carry the bacteria at some point in their life time. Cat below one year of age infested with fleas acts as the chief source of infection. Cat scratch disease is reported from many regions of the world, such as Africa, Australia, Canada, Europe, Japan, and USA. Presently,

in USA, the disease affects 22,000 people annually accounting for more than 2000 hospitalizations with an annual loss of US Dollar 12 million. Cat owners, pet handlers, and veterinarians are at a greater risk of acquiring cat scratch disease due their occupational exposure. The children who play with young cats are more likely to be scratched or bitten, and hence, are generally more affected. Cat is recognized as the prime natural host and transmitter of *B. henselae* infection. However, the infection due to *B. henselae* has also been described in other animals, such as dog, monkey, porcupine, and rodents. The role of dogs and other animals in the transmission of cat scratch fever to humans is not known. Transmission of infection in humans occurs through abrasion, scratch, lick or bite of the infected cat. Infection can also occur if saliva from an infected cat comes in direct contact with open wound. Cat flea also plays a role in the transmission of infection. There is no evidence of human to human transmission of disease. Handling, playing or kissing with a cat, particularly a kitten, which results in scratches from infective flea feces contaminated claws, is recognized a significant risk factor to human infection. The first early sign is development of small papules and pustules at the site of injury subsequent to bites or scratches by cat. Later, the patients show systemic symptoms, such as low grade fever, chills, headache, anorexia, sore throat, night sweat, abdominal pain, backache, fatigue, malaise, weight loss, rash, arthritis, osteomyelitis, lymphadenopathy, conjunctivitis, neuroretinitis, hepatitis, endocarditis, pneumonia, meningoencephalitis, septicemia, and hemolytic anaemia. Lymphadenopathy, the most common clinical manifestation in cat scratch disease, is frequently seen on several body parts, such as axillary, head, neck, and groin. Persons who are suffering with diabetes, cancer, HIV/AIDS or undergoing organ transplantation have an increased risk of getting serious illness from *B. henselae*. Cat scratch disease is mostly severe in immunocompromised patients in whom bacillary angiomatosis, and bacillary peliosis may develop. The peak incidence of disease in temperate zones is recorded during autumn and winter. In USA, maximum cases of cat scratch disease are observed in males and children. It is reported that 80% of affected patients are less than 21 years of age. In order to confirm the clinical diagnosis of cat scratch disease, laboratory help is imperative. This includes several techniques, such as isolation of the pathogen from clinical specimens on media like Columbia agar, application of Hanger-Rose intra-dermal test, histopathological detection of organisms in biopsy of the affected lymph node with Warthin-Starry stain, demonstration of antibodies in the serum of patient by enzyme linked immunosorbent assay (ELISA) and indi-

rect fluorescent antibody (IFA), and identification of *B. henselae* by polymerase chain reaction (PCR). As the isolation of pathogen is difficult, serological testing by IFA is considered simple method for diagnosis. The disease should be differentiated from brucellosis, Lyme disease, lymphogranuloma, and lymphadenitis. As cat scratch disease is self-limiting disease, no antibacterial antibiotic therapy is required. However, treatment of disease in severe cases, immunocompromised patients, and in children can be attempted with antibiotics, such as erythromycin, azithromycin, ciprofloxacin, rifampin, doxycycline, gentamycin, and chlortetracycline. A combination of two antibiotics therapy is also suggested. The dose and duration of therapy depend on clinical condition of patient. The treatment usually last from 5 days to 14 days. It is pertinent to mention that doxycycline should be avoided during pregnancy because of teratogenic side effects. In some patients, surgical involvement, such as puncture of suppurative lymph node to drain the pus, and removal of the infected lymph node is needed. Currently, no vaccine is commercially available to immunize humans or cats. Some preventive measures, such as thorough washing of cat bite or scratch with soap and water, regular checking of cat for flea, keeping the cat indoor and administering ante-flea treatment, trimming of nails to minimize scratches, covering cat claw with soft nail cap to prevent injury, preventing cat to lick the open wound, avoiding scratches or bites when playing with cat, using protective clothing while handling cat, washing of hands after contact with cat, and restrain of pet cat not to mix with feral cat, will diminish the incidence of cat scratch disease. In addition, it is highly essential to impart health education to children and cat owners about the mode of infection, severity of disease, avoiding rough handling of cat, immediate medical attention to cat bite, and proper hand washing with antiseptic solution after touching cat. Moreover, immunocompromised persons are advised to purchase only adult cat and not kitten. The control of flea in cat is practical method to decrease the risk for human infections. Hence, comprehensive flea control programme for cats should be launched in those regions where disease is prevalent. It is important to state that children, person with open wound, and immunocompromised subjects should keep away from direct contact with the suspected carrier cat, as it may serve as source of infection. In order to check any complications in immunocompromised patient, the emphasis is laid on rapid diagnosis and prompt specific treatment. It is advised that patient presented at the hospital with a history of scratch or bite or scratch with cat and regional lymphadenopathy should be prudently examined for *B. henselae* infection. Research should be focused on the development of safe, potent, and low cost vaccine, which can be widely used to immunize the cat population, and thus may prove helpful to reduce the risk of infection to humans. It is emphasized to elucidate the role of dogs and ticks in transmission cycle of cat scratch disease, which is an emerging bacterial zoonosis of global public health importance.

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