

Case Report

S. Gallinarum from Human Sample-First Case Report in India and an Alarm to Non-Vegetarians and Poultry Workers

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Abstract

Salmonella Enterica, Serovar Gallinarum is the causative agent of Fowl Typhoid (FT). It is an acute septicemic disease of chickens and other galliformae birds. FT is associated with infected poultry eggs and this is the reason for transmission of FT from one generation to other. No case report of Salmonella enteritica serovar gallinarum has been reported from humans. We hereby present with the 1st case report of *S. Gallinarum* in a patient with severe loose motions. The isolate was confirmed using Vitek 2 system using GN ID cards. The patient recovered completely after treatment.

Keywords: Birds; Chickens; Galliformae; *S. Gallinarum*; Vitek 2

Introduction

Fowl typhoid (FT) the causative agent of an acute septicemic disease of chickens and other galliforme birds is caused by *Salmonella enterica Serovar Gallinarum* (SG) [1] It is one of the most important cause of poultry disease in birds and is responsible for high mortality and morbidity [2]. *S. Gallinarum* infection in India became prominent for the first time when it was recorded as the commonest Salmonella of avian origin at the National Salmonella Centre at Indian Veterinary Research Institute, Izatnagar [3]. 95 isolates of *S. Enterica* belonging to *S. Gallinarum*, *S. Enteritidis*, *S. Typhimurium*, *S. Bareilly* and *S. Paratyphi B* has been reported with the overall prevalence of 14.40% from North eastern region of India [4]. In the studies done in Karnataka, Maharashtra, and Tamil Nadu, the most predominant serotype isolated from poultry was *S. Gallinarum* [5]. Several factors can affect Salmonella colonization in poultry, including the age and genetic susceptibility of the birds, bird stress due to overcrowding or underlying illness, level of pathogen exposure (infectious dose), competition with gut microflora for colonization sites, infecting *Salmonella serovar*, and whether the strains carry genetic factors that facilitate attachment to the birds' gastrointestinal tracts or evade host defenses [6]. SPI-13 and SPI-14 genes are important in the pathogenesis

of *S. Gallinarum* [7]. The antimicrobial drugs such as β -lactams, aminoglycosides and fluoro quinolones are used to treat local and systemic infections caused by *S. Gallinarum* and *S. Pullorum* in commercial chickens [8]. Multi drug resistant *S. Gallinarum* is rising amongst poultry. Human salmonellas is typically associated with the consumption of contaminated foods, such as fresh and processed meat and poultry, eggs [9]. But to the best of our knowledge, no case report of *S. Gallinarum* causing human infection has been reported so far. We hereby report the 1st case report of *S. Gallinarum* from human sample.

Case Report

A 40 year old farmer was admitted to the MIT super speciality hospital, Aurangabad (Maharashtra) on 13th September 2016 with complaints of fever, abdominal discomfort, loose motions up to 10 episodes per day since 4-5 days. Patient also had 3-4 episodes of vomiting since 2 days. He had history of eating non vegetarian food at a restaurant. On physical examination he appeared to be ill and toxic. He was febrile with temperature of 102°F, blood pressure 90/60 mm Hg, pulse rate 118/min and respiratory rate 16/min. Stool sample was sent to laboratory for culture.

Microbiological Examination

On gross examination, the stool was liquid with no worm segments. Microscopy showed the presence of pus cells and

RBC's. Sample was inoculated on Blood Agar and MacConkey's agar and was incubated at 37°C for 24 hours. On blood agar and MacConkey's agar 2 types of colonies were seen.

Colonies on Blood Agar

Colony 1: 2-3mm, greyish white, smooth, convex, opaque, beta haemolytic colonies

Colony 2: 2-3mm, circular, low convex, smooth, translucent, non haemolytic colonies

Mac Conkey's Agar

Colony1- Lactose Fermenting, 2-3mm, circular, convex colonies.

Colony 2- Non Lactose Fermenting (NLF), circular, low convex colonies.

Both the colonies were subjected to biochemical reactions and Antibiotic Susceptibility testing. Colony 1 was identified as *E.coli*.

Test	Result
Motility	Non motile
Catalase	Positive
Oxidase	Negative
Indole	Negative
Methyl Red	Positive
Voges Proskauer	Negative
Citrate	Was not utilised
Urea	Not hydrolysed
Triple Sugar Iron	Alkali/acid with H ₂ S without gas
Lysine Decarboxylation	Positive
Ornithine Decarboxylation	Positive
Nitrate	Was reduced to nitrite
Phenylalanine Deamination	Negative
Malonate Utilization	Negative
Lactose	Not fermented
Dulcitol	Fermented
Sucrose	Not fermented
Salicine	Not fermented
Inositol	Not fermented
Maltose	Fermented
Arabinose	Not Fermented
Sorbitol	Fermented

Table 1: Biochemical reactions of colony 2 (NLF Colony).

The biochemical reactions match with *Salmonella* and as dulcitol was utilised it raised doubt of *S.Gallinarum* [10]. So, they were subjected to identification by Vitek 2 compact automated

system marketed by Biomerieux (France) using GN ID cards and antibiotic susceptibility was done using Kirby-Bauer disc diffusion method using discs of standard concentrations provided by Hi-media laboratory (Mumbai, India). He was found sensitive to Amoxicillin-clavulanic acid (20 mm), Ceftriaxone (25 mm), Tetracycline (18 mm), Imepenem (25 mm), Aztreonam (24 mm) and resistant to Amikacin (8 mm) and Norfloxacin (11 mm) [11]. He was given ceftriaxone intravenously 1gm BD for 7 days. The patient recovered completely after treatment.

Discussion

Over years, human infection and food poisoning by *Salmonella* is on rise dramatically in Europe, USA and other parts of the world. Poultry and poultry products are the major source of infection [12]. *S.Gallinarum*, the causative agent of FT, is the most prevalent host adapted *Salmonella* strain of poultry in India [13]. *S.Gallinarum* has increased ability of to colonize and/or survive due to an adaptive immunity in poultry and hence it is found abundantly than other *Salmonella* [14]. In one study, in broiler chickens out of 23 *Salmonella* isolates, 19 samples were identified as *S.Gallinarum* and 4 samples as *Salmonella* Enteritidis [15]. In the study made by Rajgopal et al, all the 3 isolates were *S.gallinarum* [16]. So it is beyond doubt that *S.Gallinarum* is the most prevalent *Salmonella* strain in poultry. But no case report has been reported from humans. Our patient had history of eating non vegetarian food 1 day back at Dhaba. So there are chances that he might have got infection from the improperly cooked food. The patient was found sensitive to most of the antibiotic except amikacin and Norfloxacin.

This is the first case report of *S.Gallinarum* from human sample. Our identification was possible due to Vitek 2 system. It is difficult to identify *S. Gallinarum* biochemically and many sugars are required for its identification. So, this might be the possibility of non reporting of the cases till date.

Conclusion

We presented the first case report of *S.Gallinarum* from human sample. This case report might be an alarm to specially non vegetarians and poultry workers who are constantly in contact with the microorganisms. As drug resistance of *S.Gallinarum* amongst poultry is being on rise, the drug resistance strains might emerge in humans.

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