

# CASE REPORT

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## “SALMONELLA ENTERICA SEROTYPE CHOLERAESUIS, A RARE PATHOGEN – REPORT OF TWO CASES”

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**ABSTRACT:** Nontyphoidal salmonellosis is well known clinical entity. Outbreaks of gastroenteritis, septicemia and meningitis caused by different nontyphoidal salmonellae have been reported in the past. *S. choleraesuis* is the highly swine adapted serotype of salmonella causing swine paratyphoid. It is extremely invasive and may be isolated from other animals, including man.

We report two cases of *S. choleraesuis* infections, one in electric burn wound and the other in a fatal case of meningitis. In the first case the organism was repeatedly isolated from the wound. The source of infection was the patient’s intestine. This is very interesting as human carriage of *S. choleraesuis* is rare.

**KEY WORDS:** Salmonella choleraesuis, meningitis, wound infection.

**INTRODUCTION:** *S. choleraesuis* is the swine adapted serotype causing swine paratyphoid, but it can be isolated from other animals including humans.<sup>[1]</sup> The organism is known for its invasive nature causing bacteremia, subsequently leading to focal infections such as septic arthritis, pneumonia, peritonitis and cutaneous abscess.<sup>[2]</sup>

A study done in Taiwan has demonstrated that it has great propensity for extra intestinal infection.<sup>[3]</sup>

### CASE REPORTS:

**CASE ONE** - Electrical burn wound infection.

A six year old boy was referred to the department of surgery with electric burns on right arm within three hours. His heart rate was 140/min and respiratory rate - 22/min.

Patient was irritable, semiconscious, not responding to verbal stimuli. His pupils were partially dilated, reacting to light. Other systems were normal.

On Examination his right brachial and radial pulse were non palpable, right upper limb was swollen tense, cold clammy, discolored, suggesting early gangrenous changes. The diagnosis was Electrical burn cellulitis and compartment syndrome. Fasciotomy was done and empirical antibiotics started.

# CASE REPORT

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The investigations showed total WBC count - 25,000/cmm, Neutrophils 80%, Lymphocytes 19%, Eosinophils 01%, Basophils & Monocytes 0%.

The wound was debrided on three separate occasions. Despite repeated debridement and antibiotic treatment, cellulitis and gangrene progressed further and below elbow amputation had to be performed after twelve days of admission. The amputation stump was also infected. Culture of pus from wound site on four different occasions showed growth of pseudomonas & salmonellae initially; before debridement and pure growth of salmonellae later on. All strains of salmonellae showed similar sensitivity pattern. They were sensitive to Amikacin, ciprofloxacin and resistant to ampicillin, tetracycline, cotrimaxazole, chloramphenicol, ceftazidime and ceftriaxone.

The stool sample of the patient also showed growth of salmonella with similar antibiogram.

All salmonella isolates from wound as well as from stool were identified as Salmonella enterica, serotype Choleraesuis (Antigenic formula-6,7:c:1,5) by National Salmonella & Escherichia coli serotyping centre, Central Research Institute, (CRI) Kasauli, India.

Initially the patient was treated with ceftazidime & amikacin and after the sensitivity report; he was treated with parenteral and oral ciprofloxacin. The patient was discharged against medical advice one and half months after admission and hence lost to further follow up.

## CASE TWO - Neonatal Meningitis

A male baby, 32 weeks gestational age weighing 1.7 kg was delivered by LSCS due to Pregnancy Induced Hypertension in mother.

It was admitted to our Neonatal ICU for prematurity.

On examination, the baby was tachypnoeic, muscle tone was weak matching prematurity. Other systems were normal. C-Reactive Protein was <6mg/l(CRP) and total leukocyte count was normal. The baby was empirically treated with ampicillin & gentamicin. On third day of admission, icterus was noticed. Total Bilirubin level was 8.3 mg. Indirect-1.2 mg, Direct-1.1 mg. Repeat CRP was positive, with titer 48 mg/l. His blood culture was sterile. Total leukocyte count 4100/cmm; Polymorphs 53%, Lymphocytes 42%, Eosinophils 03%, Monocyte 01% Basophil 01% , ESR 5mm/hr.

Baby was treated with ceftizoxime 8 mg IV 12 hourly and amikacin 9 mg IV 12 hourly. On the 4<sup>th</sup> day of admission the baby deteriorated; was sick, cyanosed, tachypnoeic, and had two episodes of apnea. CSF cytology showed WBC-70/cmm, Polymorphs 65%, Lymphocytes 35%; Proteins 179 mg/dl, Sugar 13 mg/dl. Gram stain showed abundant pus cells and gram negative bacilli. The patient was treated for pyogenic meningitis with ceftizoxime 100 mg. and amikacin 10 mg IV 12 hourly. Mannitol & phenobarbitone drip was started. Despite treatment and resuscitative measures the baby expired. CSF was collected immediately after death. Both the CSF samples ante mortem as well as post mortem showed growth of salmonella species resistant to amikacin , ciprofloxacin, ampicillin, tetracycline, cotrimaxazole, chloramphenicol, ceftazidime and ceftriaxone.

The CSF isolates were later confirmed as *S. choleraesuis* by CRI, Kasauli

**DISCUSSION:** The genus salmonella obtained its name from the American veterinarian Daniel Elmer Salmon, who first isolated Salmonella enterica Serotype Choleraesuis from pigs in 1885.

## CASE REPORT

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[3] Most common manifestation of nontyphoidal salmonella infection is self-limited gastroenteritis. Amongst more than 2500 nontyphoidal salmonella serotypes, *S. choleraesuis* is the one with a narrow host range. It causes swine paratyphoid. However when it infects humans, it tends to cause invasive infections.<sup>[1]</sup>

In the first case salmonellae were repeatedly isolated from the burn wound and amputation stump. The strain was sensitive to ciprofloxacin. Despite treatment with ciprofloxacin, repeated *Salmonella* isolations from wound continued. This prompted us to do the stool culture which showed growth of salmonellae with similar antibiogram. Probably the patient was an intestinal carrier, getting infection from his own stool.

In our second case of neonatal meningitis *S. choleraesuis* was isolated from both ante and postmortem CSF specimens.

Due to fulminant course and short stay we could not investigate the newborn and the mother thoroughly, to find out the source of infection in this case.

The source of infection in the new born usually is the mother who can infect the infant transplacentally.<sup>[4]</sup>

Infection with nontyphoidal salmonella in newborn is serious and carries poor prognosis.<sup>[4]</sup> Children with certain underlying conditions are at increased risk of bacteremia, which may lead to extra intestinal focal infections. Such conditions include very young babies, AIDS, malignancies, immunosuppressive therapy, hemolytic anemia and inflammatory bowel disease.<sup>[2,3,5]</sup>

Isolation of *S. choleraesuis* from blood, pus and stool etc. is well documented; its isolation from CSF is rare. There are very few reports of *S. choleraesuis* meningitis in literature.<sup>[6]</sup>

The serotype *Choleraesuis* appears to be limited to carrier pigs.<sup>[7]</sup> Swine as a reservoir is a concern not only because of its disease causing potential in young pigs but also because of its public health implications for humans.<sup>[8]</sup> However long term carrier status is an uncommon event.<sup>[9]</sup> Serotype *Choleraesuis* is able to survive and remain infective in the environment. Food or water sources can serve as a reservoir of infection. This serotype can lie dormant in herds until activated by one of the several possible stressors.<sup>[10]</sup>

Antimicrobial agents should not be used routinely to treat uncomplicated nontyphoidal salmonella gastroenteritis. But it is essential in the treatment of serotype *Choleraesuis* infection in view of the high rate of extra intestinal infections. Due to increasing prevalence of resistance to conventional antimicrobial agents and a high rate of Extended Spectrum Beta Lactamase producing nontyphoidal salmonella isolates, empirical therapy is required for life threatening bacteremia or focal infections. It should include a broad spectrum cephalosporin or a fluoroquinolone until susceptibility patterns are known.<sup>[10]</sup>

In 2000 fluoroquinolone resistance first appeared in Taiwan. Strains resistant to second generation cephalosporin were also identified. Imipenem became the last and only effective antimicrobial agent in infections by multidrug resistant *S. choleraesuis* strains.<sup>[10]</sup>

Awareness of the likelihood of uncommon salmonellae causing human infection should prompt identification of salmonella strains up to species level and preferably serotype identity.

We feel that more epidemiological studies are required to understand the genetics, pathogenesis & spectrum of diseases caused by *S. choleraesuis* to limit its occurrence and spread in human beings.

# CASE REPORT

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