Case study

Case study of a zoonotic infection caused by *Streptococcus suis* reported for the first time in Goa Region, India.

Abstract

This is a case study on epidemiological factors, clinical spectrum and drug susceptibility of a rare zoonotic infection caused by *Streptococcus suis* in a 60 year old female patient with a history of contact with pigs on a regular basis. The patient presented with symptoms indicative of meningitis. Blood culture analysis revealed the causative agent to be *Streptococcus suis*. Antibiotic sensitivity screening of the culture was performed. The patient was treated with ceftriaxone antibiotic and responded favorably to the treatment. We present the first human case of *Streptococcus suis* from Goa.

Keywords: *Streptococcus suis*, meningitis, hearing impairment, spondylodiscitis

Introduction

Streptococcus suis is an important pathogen which causes Streptococcosis in pigs and affects the swine industry. It is an encapsulated Gram-positive, facultative anaerobic bacterium displaying a coccoid or ovoid morphology and may occur as single cells, in pairs or in chains. It was first reported in 1954 and can be classified into 35 serotypes based on differentiation of capsular antigens. It is a neglected zoonotic pathogen and in recent times the growing incidence of this pathogen has been observed chiefly in Asia(Arends JP, Zanen HC 1988).The largest number of cases have been reported from South East Asia, Thailand and Vietnam. Sporadic reports from Singapore, Philippines and Laos(Yu-Tsung Huang , Lee-Jene Teng et al.2005) Thus far, there have not been any significant number of cases reported from India.

Although it primarily causes infection in pigs and they are the natural reservoir of the pathogen, of late an increasing number of human cases have been reported from different parts of the world and hence this particular pathogen has now been

categorized as an emerging zoonotic pathogen(Heiman F. L. Wertheim , Ho Dang Trung Nghia 2009). *Streptococcus suis* infection in humans mostly occurs in areas where pig rearing is a common occupation. The highest risk is amongst patients in the age group 47-55 yrs.Meningitis and sepsis are the most common clinical manifestations of *S. suis* infection and hearing loss is a frequent complication. Some other common clinical manifestations consist of endocarditis, arthritis, endophthalmitis and skin lesions(Gajdács M, Németh A et al. 2020).

In India, 70% of the pig population is reared under traditional small holder, low-input demand driven production system, except for a limited number of semi-commercial pig farms in Kerala, Punjab and Goa. Pork consumption is popular among select populations in India. Pig farming is extensively practiced on a domestic scale in the South Goa district and consumption of pork and related products is common in the state of Goa.

Case report :

A 60 years old female known diabetic and hypertensive was admitted to a local hospital in south Goa. She presented with a history of fever with chills, decreased oral intake, headaches and giddiness of two days duration. On the day of admission the patient was febrile, drowsy but arousable with GCS 15/15. There was h/o regular contact with pigs.

On examination temperature of 100^0C, BP 110/70, pulse 104/min, Mild neck stiffness was noted and subsequently signs suggesting otitis media and vestibular dysfunction were also noted .

Blood was drawn for routine investigation purposes and the results obtained were as follows: Procalcitonin 53.48 ng/ml , Hemoglobin 12.8 g/dl ,Total count 20000/cu-mm and platelet count 1.30lakhs/ cu-mm.

Blood and urinecultures were processed by using the BD BACTEC FX 40 system Blood culture growing small α hemolytic colonies was observed on 5% sheep blood agar plate. On Gram staining the culture presented as Gram positive cocci in chains . It was also seen to be catalase negative .

The causative bacteria was identified as *Streptococcus suis* by Bactec FX40 andVitek 2 compact system gram positive bacteria identification card (BIOMERIEUX). .

On carrying out antibiotic sensitivity tests by the disc diffusion method the bacteria was seen to be sensitive to Ampicillin, Cefotaxime, Meropenem , Linezolid, Vancomycin and Ceftriaxone .

The patient was treated with Ceftriaxone 2 mg x 8 hourly and gradually responded.

Patients responded to Ceftriaxone, with prompt improvement in sensorium and other clinical parameters gradually improving over the next 10days.

The details of the case have been communicated to the DHSS Goa for further appropriate action.

Fig:1 Growth of *Streptococcus suis* onblood agar.

Fig:2 Sensitivity plate

Discussion

To the best of our knowledge, this is the first report of human infection with *S. suis* in Goa. Human *S. suis* infection is usually acquired through occupational or household exposure to pigs or contaminated pork and pork products. The proportion of *S. suis* meningitis patients with a history of pig exposure was 41% in Thailandand 33% in Vietnam(Heiman F. L. Wertheim , Ho Dang Trung Nghia et al. 2009,Arends JP, Zanen HC 1988).The reported cases of *S. suis* infections in humans have been increasing in recent times, which may be because of improved diagnostic techniques or changes in the epidemiological pattern of the pathogen.

The risk of contracting the disease also increases with age and some studies have shown an association with alcoholism and diabetes mellitus(Suganya Yongkiettrakul , KrissanaManeerat et al.2019).

The patient described herein was in the high risk group for infection as she had been rearing pigs for several years. She had also handled raw pork one day prior to display of symptoms. Her medical history includes diabetes mellitus and mild structural heart disease and being 60 years of age she is also in the high risk age group.

Although most reports of *S. suis* are sporadic like our case, however an outbreak of *S. suis* infection did occur in Sichuan Province, China between July and August 2005(Yu-Tsung Huang , Lee-Jene Teng et.al.2005) The clinical course of patients in that outbreak was more fulminant than in previous reports, and 38 of the 215 affected patients died.

Accurate identification of the pathogen is essential for determining the correct antimicrobial therapy and also for public health reasons.*S. suis* strains display a high frequency of resistance to tetracyclines and macrolides,(Milan R. Obradovic, Mariela Segura et al 2021) .however in our case the isolate was sensitive to all the antibiotics used in the sensitivity studies.

Some patients with *S. suis* meningitis described in previous reports have experienced relapse after 2 weeks of treatment with penicillin or ceftriaxone. Such cases of relapse occurred within 1 week of antibiotic cessation and responded to prolonged treatment for 4-6 weeks.(Arends JP, Zanen HC 1988,Gajdács M, Németh A et al. 2020) Clinicians should be aware that the treatment recommendations may not be successful for all patients and may therefore need to be monitored and accordingly altered.

Conclusion

In summary one can state that *S. suis* is an emergent zoonotic infection which if not identified accurately and treated properly can have fatal consequences. Patients presenting with relevant symptoms for meningitis, endocarditis, arthritis, endophthalmitis and skin lesions should be tested for *S. suis* especially if they are in the high risk groups and have been in close contact with pigs or are in the habit of consuming pork and pork products. This is the first report of *S. suis* infection in human in Goa acquired through a zoonotic route. *S. suis* is not a notifiable pathogen in India and therefore scrutiny is only through such voluntary reports. Hence, it is very important that the pathogen should be correctly identified and the epidemiological route should be traced to avoid public health issues. Awareness

should also be created about this emerging zoonotic pathogen amongst clinicians, laboratory technicians, health care workers and above all the people involved in the pig rearing and pork processing industry such that major outbreaks can be averted.

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