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Case Report

Microbiology Section

Community Acquired Bacteremia by *Sphingomonas paucimobilis*: Two Rare Case Reports.

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ABSTRACT

S.paucimobilis has a diverse nutritional substrate spectrum and found in both environmental and hospital settings. *Sphingomonas paucimobilis* is rarely isolated from clinical specimen. This low virulence organism since has been reported to cause a variety of diseases since 1979. It has been reported to be associated with both community acquired and nosocomial diseases including bacteremia, catheter related sepsis, diarrhoeal diseases, peritonitis, meningitis, cutaneous infections, endopthalmitis, visceral infections , urinary tract infections etc. We report two cases of community acquired primary bacteremia by *Sphingomonas paucimobilis*. One of the patients was 55-year-old female who had gallbladder carcinoma and the other was a 2-year-old healthy male who had no history of any underlying disease. Both got admission in hospital with complaints of pyrexia. Blood culture yielded *S.paucimobilis* which was found to be sensitive to quinolones, chloramphenicol, carbapenems, aminoglycosides and beta lactams except penicillin and amoxicillin.

Keywords: *Sphingomonas paucimobilis*, Primary bacteremia,Community acquired

CASE STUDY

Case I

A 55-year-old female was admitted with fever, rigor and chills. She was a patient of carcinoma of gall bladder with metastasis and was undergoing chemotherapy. Her blood sample was sent for culture, blood count and biochemical tests. The CBC revealed a total leukocyte count of 5400, Haemoglobin 7.1, RBC count 0.28 milllion and platelet count as 50,000. Her bilirubin level was within normal range.

Case II

A 2-year-old healthy boy was admitted with complaint of fever for a week with an episode of vomiting. His medical history did not reveal any underlying disease. His CBC revealed a total leukocyte count of 17400, RBC count 0.45 million and Platelet count 0.25 million. His haemoglobin and bilirubin level were within normal range. His CRP was positive. A blood culture was done which yielded a positive result within 24 hours [Table/Fig-1].

Blood samples from both the patient were inoculated into the BacT/Alert 3D bottles (PA or FA according to age), and incubated into the BacT/Alert 3D systems(Bio Merieux). In both the cases the machine reported positive growth within 24 hours. Sub-culture was done on Blood agar and MacConkey agar. On Blood agar deep yellow, smooth, convex, raised and non haemolytic small colonies were observed after incubation for 24 hours at 37°C. No growth was observed in MacConkey agar. Gram stain showed gram negative bacilli and motility test showed feebly motile bacilli. The organism was positive for Catalase, Oxidase, and esculin hydrolysis and negative for indole, citrate, and nitrate reduction. It showed red/red reaction with no gas and H_2S production on TSI agar slant. The differentiating features of two pathogenic species of *Sphingomonas* (i.e. *S.paucimobilis* & *S.parapaucimobilis*) and *Pseudomonas* has been given on [Table/Fig-2]. Confirmation of identification was done by Vitek 2 (Biomerieux).Antibiotic sensitivity test was done by Kirby Bauer method.In both the cases the organism was found to be sensitive to quinolones,chloramphenicol,carbapenems,aminoglycosides ,beta lactams and resistant to penicillin and amoxicillin.

[Table/Fig-1]: Yellow pigmented colonies of *Sphingomonas paucimobilis* in blood agar

In the Case I patient was given Amikacin and Ceftriaxone for 7 days.In Case II patient was given Ceftriaxone for 7 days.In both the cases the fever had subsided within 4 days.After completion of treatment a repeat blood culture was done which yielded a negative result indicating a complete recovery and they were discharged thereafter.

DISCUSSION

Sphingomonas is a Gram negative strictly aerobic, non-sporing bacterium. It shows sluggish motility and hence named *paucimobilis* [1] accordingly. It produces yellow- or off-white-pigmented colonies on blood agar. Homes et al., named it as *Pseudomonas paucimobilis* to differentiate from Xanthomonas on basis of various phenotypic characters [1]. Yabuchi et al., later reclassified it in 1990 as *Sphingomonas paucimobilis* [2].

Sphingomonas paucimobilis has been associated with variety of infections ranging from milder illness to serious ones. Till now the cases reported of *Sphingomonas* has a very low mortality rate and a good prognosis unlike other gram negative bacteria. This can be attributed to the fact that the organism lacks lipo-polysaccaride layer and instead has sphingolipids in the cell wall [2]. The first case of *Sphingomonas paucimobilis* was reported in1979 in an infectious

Characteristics	*S.paucimobilis*	S.para*paucimobilis*	*Pseudomonas* sp.
Growth in Mac Conkey agar	--	--	+
Gram Stain	GNB	GNB	GNB
Catalase test	+	+	+
Oxidase test*	+	+	+
Indole	--	--	--
Citrate	--	+	+
Esculin	+	+	+/--
H_2S in Lead acetate	--	+	--
Polymixin B	S	V	S
Vancomycin	S	S	R
Pigment production	Deep yellow	Deep yellow	Green/blue/yellow /red etc
Motility**	Motile	Motile	Motile
Motility**	Motile	Motile	Motile

*In 10% *Sphingomonas sp*.oxidase is negative.
**Motility occurs at 18°C to 22°C.Cannot be detected at 37°C.Moreover in broth culture only a few bacterium are actively motile which makes it difficult to demonstrate motility.

[Table/Fig-2]: Differentiating features of *Sphingomonas* and *Pseudomonas sp*.

leg ulcer patient [3]. Since 1979 *Sphingomonas paucimobilis* has been reported to cause variety of diseases from various parts of the world including India. From India only one case of UTI by *Sphingomonas paucimobilis* in a renal transplant patient has been reported so far [4].

Most of the cases are reported in hospital setup. Generally the nosocomial infections are reported to originate from indwelling devices or contaminated hospital environment [1]. The organism can grow very easily in hospital chemicals/fluids and equipments. Community acquired infections by *Sphingomonas paucimobilis* are also reported [5-7], even though lesser in number. A community acquired infection can be defined as bacteremia developed within 72 hours of hospitalization [3]. Both the cases presented here are of community acquired primary bacteremia, as the symptoms appeared before admission in the hospital. However the source of infection could not be determined.

According to Cheong et al., [8] second most common type of infection caused by *Sphingomonas paucimobilis* was primary bacteremia. Another study by Han-Siong Toh et al., [5] showed that in case of community acquired infection the most common presentation was primary bacteremia and most of the patients were immunocompromised or had some underlying diseases.Abit different findings are seen in the study done by Bayram et al., He has reported 24 cases of *Sphingomonas* infection in *paediatric* patients 3.13 of them had community acquired infection with a clinical presentation of primary bacteremia in 12 cases and in only one case patient had UTI. Among the 24 cases he had reported 16 patients didnot have any underlying disease. In the case report by Kucukbayrak et al., patient had a neurosurgery [6]. Hence the immunity was lowered and the patient acquired *Sphingomonas* infection with a clinical presentation of right flank pain,groin pain and fever . Similarly, in the present cases immunity was not very strong in the patients, as one was of very young age (2 years) and another

Sl no.	Place	Age/sex	Underlying disease	Ref no.		Outcome
1.	Riyadh	14/M	Malignancy	[9]	Hospital acquired bacteremia	Recovery
2.	Korea	1/F	Chylothorax	[8]		Recovery
		71/F	Malignancy			Recovery
		2/F	Aplastic anaemia			Recovery
		1/M	Neonatal sepsis			Recovery
3.	India		Malignancy	Present cases	Community acquired bacteremia	Recovery
			Healthy child			Recovery
4.	Taiwan	13 cases	Diabetes, Malignancy, Chronic heart disease, Chronic lung disease, Cirrhosis, Steroid usage , Alcoholism	[5]		1 mortality
5.	Turkey	24 cases in children aging 3 days to 15 yrs.	13 cases of community acquired infection(1 UTI & 12 Bacteremia),10 had no underlying diseases,3 had Downs Syndrome,Premature birth and PSAGN (Post-streptococcal acute glomerulonephritis) respectively	[7]	13 cases of Community acquired and 11 cases of hospital acquired bacteremia in paediatrics	Recovery
6.	Turkey	46/F	Patient had undergone neurosurgery and had a ventriculoperitoneal shunt	[6]	Community Acquired Bacteremia	Recovery

[Table/Fig-3]: Cases of *Sphingomonas paucimobilis* bacteremia reported worldwide

	P	Amx	AmC	Ctr	Caz	Cfm	Ipm	Mrp	Cip	Net	Ak	C	Gen
Case I	R	R	S	S	S	S	S	S	S	S	S	S	S
Case II	R	R	S	S	S	S	S	S	S	S	S	S	S

[Table/Fig-4]: Antibiotic Susceptibility Pattern of *Sphingomonas paucimobilis* isolates *Pseudomonas* sp.

suffering with malignancy [Table/Fig-3]. lists the various incidences of *Sphingomonas paucimobilis* bacteraemia reported worldwide.

The organism has been reported to be resistant to penicillin and first generation cephalosporin, variable susceptibility towards third generation cephalosporin and fluroquinolone and susceptible to tetracycline, chloramphenicol, aminoglycosides, carbapenems and trimethoprim and sulphamethaxazole [4]. Study by Bayram

et al., reports Carbapenems as the most effective drug [7]. In our case the organism was found to be susceptible to quinolones, chloramphenicol, carbapenems, aminoglycosides and beta lactams and resistant to penicillin and amoxicillin [Table/Fig-4]. lists the antibiotic susceptibility pattern of both the isolates. The antibiotic susceptibility pattern of *Sphingomonas paucimobilis* differs in each study.Hence it is important to find out the AST pattern and treat the patient accordingly.

CONCLUSION

Every year cases of *Sphingomonas paucimobilis* are reported with increasing frequency. Hence it should be treated as an emerging pathogen and not just a contaminant of hospital setup. More importantly this organism has been reported to cause septic shock in immunocompromised patient. Hence this emerging pathogen with low virulence should be dealt more cautiously. Moreover, its mode of spread and source of infection in the community should be studied extensively.

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