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Case Report

Streptococcus pneumoniae: An unusual pathogen seen in high vaginal swab

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Abstract

Streptococcus pneumoniae are Gram positive lanceolate diplococci. In some individuals they are present as normal commensals of the nasopharynx. They cause pneumonia, otitis media, sinusitis, bronchitis and bacterial meningitis. Infection may be exogenous or endogenous in origin. *S. pneumoniae* however is not a part of the normal vaginal flora. We present a case of a 19 year old primigravida of 25 weeks amenorrhea, who presented with a history of non-productive cough since three days, abdominal pain since a day and spotting per vagina. She had a previous history of IgA nephropathy, and underwent dialysis and was on oral steroids. *S. pneumoniae* was isolated from the high vaginal swab culture. As it may predispose to neonatal sepsis, she was started on intravenous cefazolin. Due to severe pregnancy induced hypertension and premature rupture of membrane an elective caesarean section was done and a preterm low birth weight live female child was delivered. As the baby had an acute respiratory distress syndrome, feed intolerance and a raised C- Reactive protein, she was put on a ventilator and given antibiotics. This signifies that *S. pneumoniae* can be a resident vaginal flora especially in patients with predisposing factors. Patients with high risk of *S.pneumoniae* infection should be screened and vaccinated to reduce morbidity and mortality outcome for both mother and child.

Keywords: *Streptococcus pneumoniae*, high vaginal swab, screening, vaginal flora

1.Introduction

Streptococcus pneumoniae has been rarely isolated and reported as a female urogenital pathogen in the antibiotic era and to learn more about it one has to return to the pre antibiotic era. Of all the works been published, the work by Nuckols and Hertig[1], who described 3 cases and reviewed 74 cases remains the holy grail of knowledge.

Here we report one such rare instance of isolation of *Streptococcus pneumoniae* from high vaginal swab of a 19 year old primigravida.

2. Case History

A 19 year old primigravida of 25 weeks amenorrhea visited our outpatient obstetrics and gynaecology department with a history of nonproductive cough since 3 days, lower abdominal pain since a day and spotting per vagina. She was diagnosed as IgA nephropathy 3 years back, for which she underwent dialysis and was on oral steroids, antihypertensives, calcium supplements and hematinics. She had no past history of tuberculosis, asthma, cardiac illness, thyroid disorder or any surgery. On detailed physical examination, she had severe anemia, edema and high blood pressure.

2.1 Abdominal and pelvic examination

On day 1 of admission her blood, urine and high vaginal swab samples were sent for microbiological investigation. Electrocardiogram (ECG), abdominal ultrasonography and x-ray were also done. Gram's stain from the high vaginal swab showed moderate number of pus cells, few capsulated Gram positive diplococci (lanceolate shape). High vaginal swab was processed and cultured on Blood agar and MacConkey agar plates which were incubated at 37^0C for 18-24 hours. As the patient had non productive cough, sputum was not sent for culture for which she was prescribed oral cefixime 200mg bd and a cough syrup.

On day 2 her ultrasonography revealed a bilateral grade 2-3 renal parenchyma changes and

bilateral minimal pleural effusion. ECG was normal. A complete blood report showed severe anemia with hemoglobin of 5.9 g/dl and high leukocyte count (13800/cumm). C-reactive protein (44.80 mg/dl), serum urea (68mg/dl), creatinine (4.29mg/dl), serum uric acid (10.17mg/dl) were raised and proteinuria was 4+. Liver function tests showed low serum total protein (4.29g/dl), low serum albumin (2.03g/dl).

After incubation on blood agar there was a heavy growth of small, round regular, glistening moist, dome shaped colonies (draughtsman or carrom coin appearance) with an area of greenish discoloration (alpha hemolysis). Gram's staining from the culture showed Gram positive diplococci (lanceolate shape), catalase test was negative. Colonies were further identified using biochemical tests.

On day 3, bile esculin hydrolysis test was negative, differential disc testing with Optochin (Ethyl hydrocuprein) was sensitive, bile solubility test was positive and the organism was identified as *Streptococcus pneumoniae* and there was no evidence of any other vaginal infections. Urine culture showed growth of extended spectrum beta lactamase (ESBL) producing *Klebsiella pneumoniae* 10,000-100,000 CFU / ml of urine and blood culture showed no growth after 5 days of incubation as per the incubation protocol followed in our laboratory when using the 9120 Bactec automated blood culture system.

Patient gave no history of taking pneumococcal vaccination. As *Streptococcus pneumoniae* may predispose to neonatal sepsis, based on antibiotic susceptibility she was started and responded to intravenous cefazolin (1 gram bd) for 5 days. Due to severe pregnancy induced hypertension and premature rupture of membranes an elective caesarean section was done and a 28 weeks preterm low birth weight (925g) live female child was delivered. Due to acute respiratory distress syndrome, feed intolerance, and a C-Reactive protein level of 10 mg/dl, the baby was put on a ventilator for the first 3 days and started on IV Ampicillin, Gentamicin, bronchodilators and calcium gluconate from day 1 till day 10 and then again restarted on day 18 till day 22 due to bowel distension diagnosed as necrotising enterocolitis (NEC) stage I. Prematurity and low birth are considered the most important risk factors for NEC. The babies blood culture showed no growth for any pathogens including possible NEC opportunistic enterobactericeae like *Enterobacter sakazakii*. A repeated sepsis screening was also negative. Gradually the general condition of the baby did not show much improvement and she was discharged against medical advice thus further investigation to the root cause of her medical condition could not be ascertained.

Figure 1: Smear under 10X showing few pus & epithelial cells

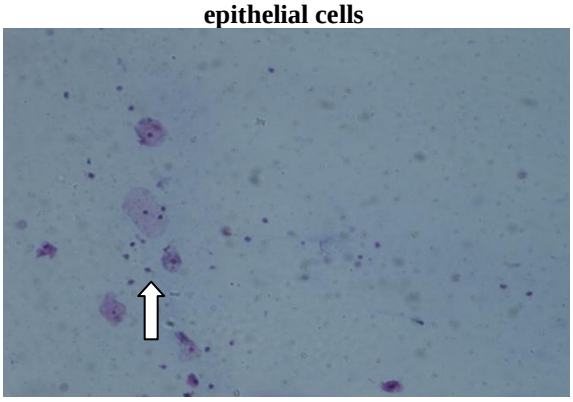


Figure 2: Smear under 100X showing *Streptococcus pneumoniae*

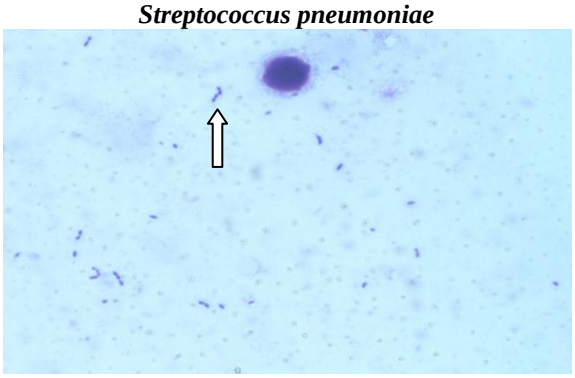
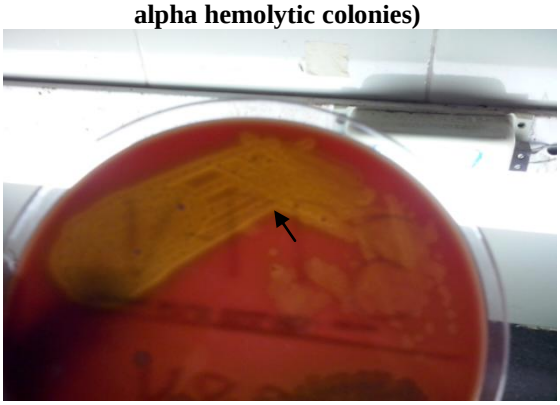


Figure 3: On blood agar (pinpoint, moist, regular alpha hemolytic colonies)



3. Discussion

*Streptococcus pneumonia*e is a major respiratory pathogen found in the upper respiratory tract of healthy adults (5-7%) and children (>30%).[2] Streptococcus *pneumoniae* (*Pneumococcus*) is not a part of normal vaginal flora. It is thought that *Pneumococci* are unable to survive at normal vaginal pH. However during pregnancy and puerperium, changes in vaginal pH may temporarily allow it to exist as a vaginal commensal[3]. In some women, it may be part of the transient vaginal flora and cause infection if predisposing factors exists[4]. Primary pneumococcal infection of female genital tract is very rare. Most often the infection may occur through four different routes.

- ***Via the female genital tract:*** As a normal vaginal commensal it may ascend during instrumentation such as insertion of intra uterine device (IUD)[5], use of tampons[6], during the postpartum period[1][7] or as a normal respiratory commensal during orogenital sexual practices[6].
- ***Infection transmurally via gastrointestinal tract:*** *Pneumococci* have rarely been isolated as an intestinal pathogen[8] but may colonize the perineum and introitus vaginae giving rise to bartholinitis, colonization of vagina and cervix leading to infection.
- ***Infection via lymphatics:*** clinical possibility, but no evidence exists.
- ***Infections via bloodstream:*** Bacteremia accompanying respiratory pneumococcal infection may cause secondary seeding to fetus via female genital tract[4].

If mother harbors *S. pneumoniae* as a normal commensal in the vaginal flora, the child may get infected either during premature rupture of membranes or child birth. The child may present with pneumonia, septicemia or meningitis with mortaility as high as 60%[2]. Even in the absence of symptoms, isolation of *S. pneumoniae* warrants antibiotic therapy for both mother and baby[4]. 23 polyvalent pneumococcal vaccines are available for prophylaxis against *S. pneumoniae*. However, the lack of awareness about pneumococcal vaccine is one of the reasons for increased reports of *S. pneumoniae* infection.

In our case, a primigravida belonging to low socio-economic status had present with history of cough and was on steroids for chronic kidney disease. Since pus cells were seen on the Gram's stain of vaginal smear and C-reactive protein was raised thus contamination and colonisation by *S. pneumoniae* were ruled out. The presence of a predisposing factor, lack of proper hygiene along with a history of no pneumococcal vaccination was favorable for *S. pneumoniae* to colonize and cause infection of the genital tract (exogenous) and may be the reason for abdominal pain and pre rupture of the membrane. However, since respiratory sample was not sent as she had nonproductive cough and patient was empirically treated on antibiotics and cough syrup the symptom was relieved and the exact route of transmission could not be ascertained.

As baby was delivered by caesarean section and mother was given prophylactic antibiotics, no pathogen was isolated from the baby's blood culture.

This represents only the tip of iceberg, as most of the cases remain undiagnosed due to lack of facilities and awareness among clinicians. Thus screening of pregnant females for pneumococcal infection can be made mandatory in most of laboratories.

4. Conclusion

Streptococcus pneumoniae can be a resident vaginal flora especially in patients with predisposing factors. Patients with high risk of *Streptococcus pneumoniae* infection should be screened and vaccinated. Maternal carriage or neonatal colonization should be aggressively treated to prevent materno fetal complications.

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