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PNEUMONIA CAUSED BY *Moraxella catarrhalis* AND SMALL COLONY VARIANTS OF *Staphylococcus aureus* IN AN IMMUNOCOMPETENT ADULT PATIENT: CASE REPORT AND REVIEW OF LITERATURE

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ABSTRACT

***Moraxella catarrhalis* and Small colony variants (SCVs) of *S. aureus* are both respiratory pathogens, with the latter causing persistent, indolent infections. *M. catarrhalis* is a Gram negative coccobacillus whereas SCV *S. aureus* is Gram positive with variable sizes. SCVs can often be missed unless proper identification is done, followed by susceptibility testing, since they can be frequently refractory to many antibiotics. Also, antibiotic susceptibility can be different in *M. catarrhalis* and SCV *S.aureus,* which makes empirical treatment more difficult. All these points are interesting areas of research.**

KEYWORDS: *Moraxella catarrhalis*, SCV *S. aureus*, Susceptibility

Moraxella catarrhalis is an established respiratory pathogen, with multidrug resistance seen very commonly(Gupta N *et al*, 2011). *Staphylococcus aureus* is also a proven respiratory pathogen, with most number of cases in Cystic fibrosis, and is also associated with worse lung function in Cystic fibrosis(Goss and Muhlebach, 2011). Chronic obstructive pulmonary disease (COPD) is also a risk factor for pneumonia due to *M. catarrhalis*,which can also infect children, while Diabetic ketoacidosis is also a risk factor for lung infection by *Staphylococcus aureus* (http://downloads.lww.com, Verduin *et al*, 2002). *M. catarrahalis* is also common in nosocomial pneumonia(Verduin *et al*, 2002). SCV *S. aureus* can be difficult to diagnose since pigmentation is often absent, hemolysis is absent and coagulase may be delayed (Vaudaux P *et al*, 2006). Mixed pneumonia can be found with *M. catarrhalis* in conjunction with *Hemophilus influenzae* and *S. pneumoniae*, but it is rare in conjunction with SCV *S. aureus*(Enright MC *et al*, 1997). We here discuss such a case.

CASE REPORT

JA, a 35 year-old male patient, who was non-smoker presented to the Pulmonary Medicine OPD with chief complaints of slowly progressive cough which used to occur more in early morning with mucoid expectoration and respiratory distress since the last 2 months. The patient also had low grade fever without evening rise of temperature. There was no history of hemoptysis. The patient gave history of travel to the middle east 5 months back. Chest X ray (PA view) showed no abnormality. On haematological investigation, his Total leucocyte was 12,400 /mm3 , polymorph 82%, Lymphocyte 14%, Random blood sugar 110 mg%, and blood urea nitrogen within normal limits. Sputum sample was obtained and sent for microbiological evaluation. Gram stain showed copious pus cells, Gram negative coccobacilli mostly in pairs, and gram positive cocci of different sizes arranged in clusters. ZN staining for AFB was negative in two consecutives sample .Culture of the sample was carried out in 5% sheep blood agar and MacConkey agar. After overnight incubation at 37°C, 2 types of colonies were found: opaque, small (0.1 mm) low convex colonies that were pink on MacConkey agar, and larger (2 mm), translucent colonies that were non-lactose fermenting on MacConkey agar. The smaller colonies showed Gram positive cocci on Gram's staining, while larger colonies revealed Gram negative coccobacilli arranged in pairs. The larger colonies were also oxidase positive and reduced nitrate to nitrite, but were negative for indole production, citrate utilisation and sugar fermentation on TSI slant. The smaller colonies were non-pigmented and delayed positive for slide coagulase test. Both colonies were non-hemolytic. Smaller colonies turned to larger, wild-type colonies on growing in a Carbon dioxide-rich environment, in a CO_2 incubator (having 5% CO_2). Thus the smaller colonies turned out to be CO_2 auxotrophic SCV *Staphylococcus aureus*. There was no increase in size on growing in chocolate agar (to check for hemin auxotrophism) or around Vitamin K disks (15 µg Vit. K) on a Mueller Hinton Agar plate. Antibiotic susceptibility of both isolates were done by Kirby Bauer disk diffusion on Mueller Hinton Agar, using the following disks: Cefotaxime (30 µg), Amoxiclav (25 µg), Amikacin (30 µg), Netilmicin (30 µg) only in case of SCV *S. aureus*, Piperacillin-

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Tazobactum (only in case of M. catarrhalis) and Azithromycin (25 µg) disks (HiMedia labs, India) as per CLSI protocol(Clinical Laboratory Standards Institute 2006). The patient improved on antibiotic therapy and symptoms resolved.

DISCUSSION

Double pneumonia is very rare in the clinical and lab practice, commonly seen in aspiration pneumonia, and empiric treatment becomes difficult if the microorganisms retrieved have different antibiotic susceptibility pattern(http://www.patient.co.uk.). Infection by SCV *S. aureus* tends to persist in humans due to unique features like less clinical manifestations and resistance to many antibiotics, especially in Vitamin K auxotrophic SCV *S. aureus* , due to diminished transmembrane drug transport(Sendi P *et al*, 2006, Lennergard J *et al*, 2008). It is also a well-documented fact that Chest roentgenogram may be false negative in cases of pneumonia, in up to 30% cases where CT (Computerised Axial Tomography)scan revealed pneumonia(Maughan B *et al*, 2014) .Thi si especially true in case of early lung infection and affection of the lingular region(Maughan B *et al*, 2014). Our case highlights the importance of double bacterial pneumonia and need to follow up these cases and perform full battery of laboratory investigations.

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