Antimicrobial Sensitivity of Pasteurella Dagmatis and Pasteurella Caballi Isolates from Ocular and Nasal Infections in Horses

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Abstract
Pasteurella infections in horses are not frequent and only a few Pasteurella have been reported causing infection in horses. Pasteurella rarely causes any fatal infection in horses but in association with other bacteria or virus may be problematic. Since March 2011 to September 2017 we encountered only two cases where Pasteurella strains could be detected. In one case horse with conjunctivitis and ocular discharges had mixed infection of Pasteurella dagmatis and Streptococcus equi ssp. zooepidemicus, and in another case of strangles, Pasteurella caballi could be isolated along with Streptococcus equi ssp. equi. In both the cases Pasteurella isolates were sensitive to most of the commonly used antibiotics. Both the cases were cured after strepto-penicillin treatment.

Keywords: Pasteurellosis, Pasteurella infection in horses, Pasteurella dagmatis, Pasteurella caballi, Streptococcus, Enterococcus, Antibiotic Sensitivity, Herbal drug sensitivity.

1. Introduction
Pasteurellosis or Pasteurella infections in horses are not common and Pasteurella isolates have sometimes been reported to be the cause or causal factor in respiratory tract infections in association with other bacteria having potential pathogenicity (Wood et al., 1993; Hayakawa et al., 1993, Derksen, 1993). Here, one ocular and other upper respiratory tract infection case associated with P. dagmatis and P. caballi infection, respectively have been described.

2. Materials and Methods
From Veterinary Polyclinic of the Institute ocular swab was received for identification of bacteria and antibiotic sensitivity testing (ABST) on 23 July 2011. In another case, nasal swabs from a young horse, with clinical signs of strangles, was received on 23 August 2017. The swabs were inoculated on to sheep blood agar plates in duplicate and incubated at 37°C for 24 h. The isolated colonies were picked and identified using standard biochemical, growth and culture characteristics (Markey et al., 2013; Singh, 2009). The antimicrobial sensitivity of the selected isolates was determined using disc diffusion assay on the suitable medium as described by Singh 2013 following CLSI standards. The sensitivity of isolates was determined against herbal as well as conventional antimicrobials.

Pasteurella isolates were submitted to Pasteurella Reference Laboratory, Division of Bacteriology, IVRI, Izatnagar for confirmation of the species of the isolates.

3. Results
From Ocular swabs Pasteurella dagmatis was isolated along with Streptococcus equi ssp. zooepidemicus. Both of the isolates were resistant to the essential oil of Ageratum conyzoides, Xanthoxylum rhetsa, Eupatorium odoratum, Patchouli, Sandalwood, Agarwood but sensitive to Carvacrol. Both of the bacteria were also sensitive to ampicillin+sulbactam, tetracycline, gentamicin, ciprofloxacin, nitrofurantoin, chloramphenicol, and erythromycin while resistant to cotrimoxazole, and nalidixic acid. Pasteurella dagmatis strains was resistant to ampicillin and amoxycillin while S. equi ssp. zooepidemicus strain was sensitive to both of the drugs.

A total four types of bacteria including Pas-
teurella caballi, Streptococcus equi ssp. equi (both in large numbers), Streptococcus milleri and Enterococcus solitarius. All the strains were sensitive to essential oils of ajowan, betel leaves, thyme, cinnamon, holy basil, lemon grass but none to essential oil of agarwood. Carvacrol, cinnamaldehyde and citral (1 mg/ml) inhibited the growth of all the four strains. Guggul oil and sandalwood oil failed to inhibit the growth of P. caballi and S. equi only while gum acacia, and essential oil of patchouli inhibited both the strains, the results for these herbal antimicrobials were opposite for S. milleri and E. solitarius strains. Most of the antibiotics inhibited growth of all the four strains isolated from streptococcus horse including ampicillin, amoxycillin, tetracycline, gentamicin, nitrofurantoin, cotrimoxazole, ciprofloxacin, chloramphenicol, cefazidime, meropenem, erythromycin, cefotaxime, tigecycline, ceftriaxone, cefoxitin, cephepine, and pipercillin. Aztreonam, azithromycin, cefixime, colistin and penicillin were effective only on S. equi and P. caballi strains.

4. Discussion

Pasteurella strains have mostly been reported in mixed culture from horses and seem to be mostly the pathogens of very importance (Wood et al., 1993; Hayakawa et al., 1993, Derksen, 1993). In both the cases reported here Pasteurella were isolated with other bacteria but both the samples being from open orifices have a probability that other bacteria (common in horses) might be just contaminants and Pasteurella strains might be more important cause of the pathology. The P. dagmatis and P. caballi isolation from horses have been reported earlier (Wood et al., 1993; Hayakawa et al., 1993, Derksen, 1993) also but antibiotic and herbal drug sensitivity pattern has rarely been reported. Sensitivity of P. dagmatis, as well as P. caballi to most of the antimicrobials, indicated that either the horses have rarely been exposed to antibiotics (however, it does not seem to be true as antibiotics are commonly used in horses in India and drug resistance is common among bacteria isolated from horses, Singh, 2009, Singh et al., 2010) or Pasteurella of these two species are mostly drug sensitive (not known yet) or emergence of drug resistance is rare in Pasteurella strains. The study on more strains of these pasteurellas can only reveal the facts.

References