

Colistin: alternative for the treatment of swine colibacillosis with the respect of human health protection

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Abstract

From suckling up to slaughter, pigs experience frequently enteritis outbreaks caused by various pathogens, most of them from bacterial origin. Preliminary epidemiological studies have shown that *Escherichia coli* are the most often isolated bacteria during diarrhoeas.

Quinolones and penicillins are the most frequently used treatments when colibacillosis is suspected. Many reports have shown these bacteria became frequently resistant when these antibiotics were massively used. Moreover, many cross resistances were demonstrated in these antibiotic families, leading to a major zootechnical and zoonotic concern.

However, some antibiotics, like colistin, are effective to treat swine enteritis while they are known to involve no or few resistance.

This article discusses some trial results that illustrate the observation of particular mechanisms of resistance of colistin that make it less susceptible to antibiotic resistance. In an experiment on the efficacy and safety of colistin for the treatment of colibacillosis in weaned piglets in an infected environment, no resistant strain of *E. coli* against colistin were isolated on rectal swabs after the treatment.

Colistin is not only clinically effective alternatives to quinolones and penicillins for the treatment of swine colibacillosis but also its use does not involve any antibiotic resistance profile. Colistin is therefore of great interest to overcome the situation of antibioresistance currently established in the intensive swine production after a massive use of the more traditional antibiotics, aminosides and macrolides, that can lead to a major risk for human health.

Introduction

From suckling up to slaughter, pigs experience frequently enteritis outbreaks caused by various pathogens, most of them from bacterial origin. Preliminary epidemiological studies have shown that *Escherichia coli* is the most often isolated bacteria during diarrhoeas.

If quinolones and penicillins are among the most frequently used treatments when colibacillosis is suspected, many reports have shown these bacteria became frequently resistant when these antibiotics were massively used. Moreover, many cross resistances were demonstrated in these antibiotic families, leading to a major zootechnical and zoonotic concern.

However, some antibiotics, like colistin are effective to treat swine enteritis while they are known to involve no or few resistance.

In an experiment on the efficacy and safety of colistin for the treatment of colibacillosis in weaned piglets in an infected environment, some bacteriological analysis are conducted at the end of the clinical study to check the emergence of resistant strains of *E. coli* against colistin.

Material and methods

In a farm with history of post-weaning diarrhoea caused by *E. coli*, piglets weaned between 21 and 28 days of age were randomly split into 2 groups.

When at least 10% of the piglets showed sign of colibacillosis, they were treated (Table 1) through drinking water either with a placebo, either with COLIVET[®] (Colistin, Ceva Santé Animale, France) for 5 days.

All sick animals (having shown clinical signs of diarrhoea at the beginning or during the experiment) were identified.

Among different criteria to assess efficacy of COLIVET[®], some bacteriological analysis were performed on feces collected by rectal swab at the end of the trial (Day 6) on all animals identified as sick during the experiment :

- Isolation and identification of haemolytic *E. coli* strains,
- Antibiogram to evaluate *E. coli* resistance to colistin after treatment.

Table 1: Protocol

	Group A	Group B
Treatment	Placebo	COLIVET [®]
Daily dosage regimen	0.5 ml/10 kg BW in 2 administrations (Volume equivalent to group B)	100,000 IU colistin/ kg BW in 2 administrations
Duration	5 days	5 days
Monitored parameters on Day 6	1- Isolation and identification of haemolytic strains of <i>E. coli</i> 2- Test of sensitivity (antibiograms)	

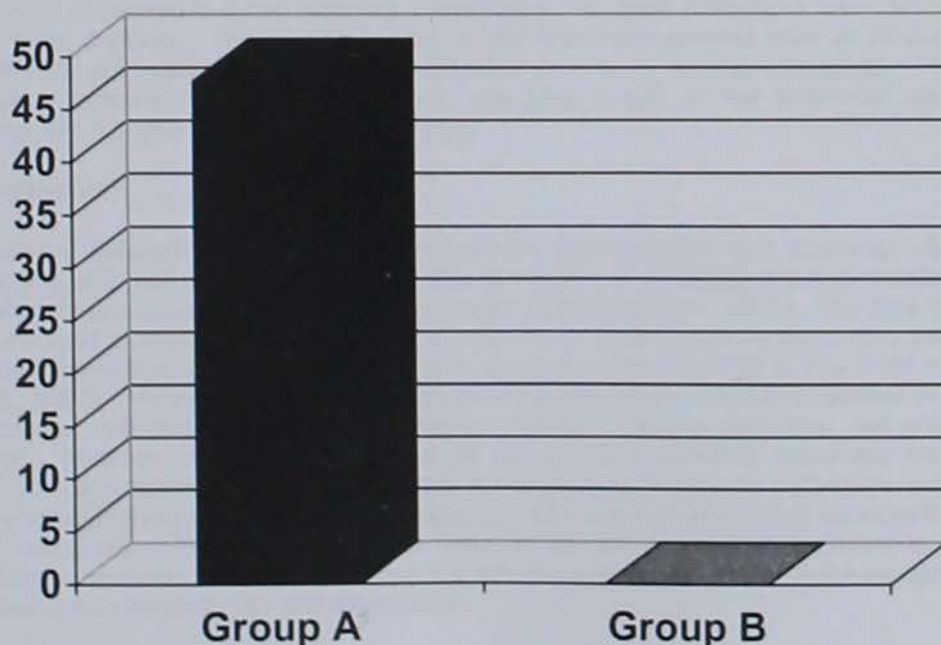
Results

Beside the clinical cure rate that was significantly higher in group B (1), the search of haemolytic strains of *E. coli* showed they had completely disappeared in group B while 47.7% of the *E. coli* strains isolated on animals of group B were haemolytic (Graph 1).

100% of this haemolytic strains isolated in group A were the serotype K88.

In addition, 100% of the *E. coli* strains isolated in both group and tested on antibiograms were all susceptible to colistin.

Graph 1: Number of haemolytic *E. coli* strains (%) isolated at the end of the treatment (Day 6)



Discussion

This trial showed not only the efficacy of colistin (COLIVET®) at the applied dose for the treatment of post-weaning colibacillosis but also evaluated the risk of development of *E. coli* resistance to this anti-infective after treatment. Its use did not induce any antibiotic resistance profile.

This result confirms that the occurrence of resistance to colistin are very rare, as reported in various studies (2).

Colistin is therefore of great interest to overcome the situation of antibioresistance currently established in intensive swine production after a massive use of more traditional antibiotics (such as quinolones and penicillins) that can lead to a major risk for human health.

References

1. DEFLANDRE, A. et al., 2006. Efficacy evaluation of colistin for the treatment of colibacillosis in weaned piglets. 19th IPVS proceedings, Vol. 2:238
2. SOGAARD, H., 1982. The pharmacodynamics of polymyxin antibiotics with special reference to drug reference liability. *J. Vet. Pharmacol. Therap.*, 5, 219-231