EFFICACY OF AMOXICILLIN IN THE CONTROL OF A CHALLENGE WITH *STREPTOCOCCUS SUIS*

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Introduction and Objectives

Infections caused by *Streptococcus suis* are considered as one of the dominant pathologies of swine. Important health issues that can affect humans must be added to the serious economic repercussions for the industry (1). Some of the bacterial components such as Capsular Polysaccharide (cps), Muramidase Released Protein (MRP), Extracellular Factor proteins (EF) and Suilysin (Sly) can be considered as virulence markers for *S. suis* species (3). The purpose of this study was to assess the efficacy of Amoxicillin in premix form (HIPRAMIX-AMOXI) for the treatment of pigs when challenged with a virulent serotype 2 *S. suis* strain.

Materials and Methods

Strain and inoculum: A highly virulent MRP+EF+Sly+ serotype 2 *S. suis* strain sensitive to Amoxicillin in vitro (MIC ≤ 0.03 µg/ml) was used for challenge. The strain was isolated from the meninges of a pig with nervous signs, identified by standard methods (2, 5) in the Health Animal Department of the Veterinary Faculty of Córdoba. The protocol used in this trial was selected according to the previous results obtained in experimental assays with respect to the inoculation route, dose and animals characteristics (data not published). One ml of a six-hour culture of this strain, in a Todd-Hewitt broth supplemented with 5 % foetal bovine serum, containing 10^8 cfu/ml, was administered by intravenous route to the pigs on the seventh day of the experiment.

Animals and experimental design: A total of 25 three week old weaned pigs (LW x LD) were randomly distributed into 3 groups according to Table 1.

Table 1. Experimental design

Group	Nº Animals	Treatment	Challenge (1 ml)
A	5	-	PBS
B	10	-	*S. suis* [10^8 cfu/ml]
C	10	HIPRAMIX-AMOXI	*S. suis* [10^8 cfu/ml]

Group C received a medicated feed with Amoxicillin (HIPRAMIX-AMOXI) at the rate of 300 ppm (equivalent to 15 mg of Amoxicillin/Kg b.w./day) from day 0 to day 15.

Monitoring: Rectal temperatures and clinical signs were recorded on daily basis. Post-mortem examination and bacteriological studies were performed from all the dead pigs during the study as well as the ones euthanasied on day 15. Blood samples were collected at day 7 and plasmatic concentration of Amoxicillin by using HPLC techniques was evaluated.

Results

Table 2. Plasma concentration of Amoxicillin at day 7 of treated pigs (Group C).

Pig Reference	Concentration (µg/ml)	Pig Reference	Concentration (µg/ml)
245	1.6362	261	0.4824
253	0.8481	263	0.8765
256	0.9923	270	0.9872
257	0.5288	272	0.4824
259	0.4953	273	0.5236

Figure 1. Rectal temperatures.

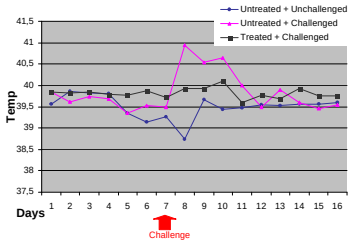

Figure 2. Post-challenge results.

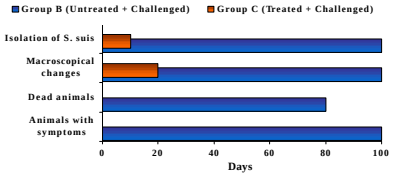

Figure 3 and 4. Photos at necropsy.

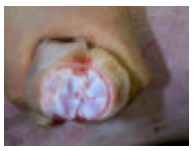

Figure 3. Joint of a treated and challenged pig.

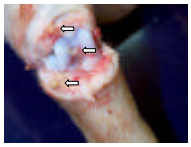

Figure 4. Joint of an untreated and challenged pig.

Discussion

Amoxicillin plasma concentration oscillated between 0.5 and 1.6 ug/ml in Group C, on day 7. These values are effective when compared to the in vitro MIC obtained (≤ 0.03 µg/ml) and superior to the MIC obtained in the previous studies with *S. suis* strains (6). Good tolerance of the feed was confirmed since no significant differences (P=0.134) in feed consumption were observed between groups B and C in the days prior to the challenge.

The rectal temperatures remained constant before the day of challenge (day 7) in all groups of pigs. Following the challenge, all the pigs from group B (untreated and challenged) showed an increase of rectal temperatures, ranging from 40 to 41.7ºC, while none of the pigs from group C (treated and challenged) showed rectal temperatures superior than 40.5ºC. No increase of rectal temperatures was recorded in pigs from group A (untreated and not challenged).

Eight pigs from group B (untreated and challenged) died suddenly or were euthanasied for humanitarian reasons, showing different clinical signs (serious weakness, anorexia, limping, prostration, trembling, incoordination and paralysis). No mortality was recorded in pigs from groups A and C.

Post-mortem examinations showed the characteristic lesions caused by a septicemic process in all the animals of group B (generalised congestion, fibrinous polyserositis) and articular lesions (purulent or serofibrinous exudates) were also observed in 8 pigs, while only 2 pigs from group C presented articular lesions. Congestion of the meninges was observed in 5 pigs from group B. No clinical signs compatible with *S. suis* infection were recorded in pigs from group A.

S. suis was isolated from different organs in all the pigs of group B and only in one pig of group C and negative results from bacterial seedings were obtained from group A.

Conclusions

The trial concludes that Amoxicillin medicated feed (HIPRAMIX-AMOXI), at a concentration of 6 Kg/tonne (equivalent to 300 ppm of Amoxicillin) for 15 consecutive days, is efficacious to control the disease caused by a highly virulent serotype 2 *S. suis* strain in pigs, when challenged.

References

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