นิพนธ์ต้นฉบับ

Long acting Oxytetracycline for control of disease in piglets

ผลของการใช้ยาปฏิชีวนะอ๊อกซีเตตราซัยคลินชนิดออกฤทธิ์ยาวนานเพื่อควบคุมโรคของลูกสุกร

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บทคัดย่อ : **พีระศักดิ์ จันทร์ประทีป, ประเสริฐ ประทีป, และ ปิยลัมพร พุ่มสุวรรณ. 2530. ผลของการใช้ยาปฏิชีวนะอ๊อกซีเตตราซัยคลินชนิดออกฤทธิ์ยาวนาน เพื่อควบคุมโรคของลูกสุกร. วารสารวิจัยวิทยาศาสตร์การแพทย์ 1(2) : 1 - 7**

ใช้แม่สุกรจำนวน 80 แม่ ในฟาร์มแห่งหนึ่ง และลูกที่คลอดออกมาได้รับการเลือกโดยวิธีการสุ่มแยกออกเป็น 2 กลุ่มเท่า ๆ กันขณะคลอด ในการทดสอบประสิทธิภาพของการให้ยาปฏิชีวนะอ๊อกซีเตตราซัยคลินชนิดออกฤทธิ์ยาวนานเป็นช่วง ๆ เพื่อควบคุมโรคในลูกสุกรหลังคลอด และเพิ่มผลผลิตของสุกร ภายใต้สภาพการเลี้ยงแบบการค้าทั่วไป แม่สุกรทั้งหมด กินอาหารที่ไม่มียาผสม ก่อนและหลังคลอด เป็นเวลารวม 2 สัปดาห์ แม่สุกร 40 แม่ และลูก 407 ตัว จัดเป็นกลุ่มเปรียบเทียบ ได้รับน้ำกลั่น 1 มล./10 กก.น.น.ตัว (ฉีดเข้ากล้าม) และ 1 มิลลิลิตร (ฉีดเข้าใต้ผิวหนัง) ตามลำดับ ในขณะที่แม่สุกรอีก 40 แม่ และลูกอีก 407 ตัว ได้รับยาปฏิชีวนะอ๊อกซีเตตราซัยคลินชนิดออกฤทธิ์ยาวนานในขนาดเดียวกับกลุ่มควบคุม (ฉีดเข้ากล้าม) และ 1 มิลลิลิตร (ฉีดเข้าใต้ผิวหนัง) ตามลำดับ การให้น้ำกลั่นและยาปฏิชีวนะดังกล่าว ได้กระทำซ้ำ เฉพาะกับลูกสุกร เมื่อมีอายุ 3, 12 และ 21 วัน หย่านมลูกสุกรเมื่อมีอายุ 28 วัน ชั่งน้ำหนักลูกสุกรแต่ละตัว เมื่ออายุ 3, 28 และ 56 วัน สังเกตและบันทึกอาการต่าง ๆ ของโรค และผลการฝ่าซากของลูกสุกร

ผลการศึกษา ชี้ให้เห็นประโยชน์ที่เกิดขึ้น ทั้งในแง่น้ำหนักและการเจริญเติบโตเฉลี่ยต่อวัน เมื่อลูกสุกรหย่านมและสิ้นสุดการศึกษาของลูกสุกร ที่ได้รับการฉีดยาปฏิชีวนะอ๊อกซีเตตราซัยคลินชนิดออกฤทธิ์ยาวนาน มากกว่ากลุ่มเปรียบเทียบอย่างมีนัยสำคัญทางสถิติ นอกจากนี้อุบัติการของโรคท้องเสีย เมื่ออายุถึง 56 วันหลังคลอด ในกลุ่มได้รับยาปฏิชีวนะตัวนี้จะต่ำกว่ากลุ่มเปรียบเทียบ ($P < 0.05$)

สรุปผลการใช้ยาปฏิชีวนะอ๊อกซีเตตราซัยคลินชนิดออกฤทธิ์ยาวนาน ให้ผลดีทั้งในแง่ของการควบคุมโรคในลูกสุกรแรกคลอด และเพิ่มผลผลิตให้แก่สุกรในฟาร์มเลี้ยงเพื่อการค้า

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Abstract : **Peerasak Chantaraprateep, Prasert Prateep and Piyalamporn Poomsuwan. 1987. Long acting oxytetracycline for control of disease in piglets. Thai J Hlth Resch 1 (2) : 1-7**

In order to test the effectiveness of periodic long acting oxytetracycline treatment for controlling neonatal diseases and improving production of pigs under commercial conditions, 80 sows and their litters were randomly assigned to two equal treatment groups at time of farrowing. They were maintained on non-medicated feed 1 week prior to and post farrowing. Each of 40 sows and their 407 piglets served as control group, received placebo (distilled water) 1 ml/10 kg b.wt. (IM) and 1 ml (SC) respectively, while each of the other 40 sows and their 407 piglets received long acting oxytetracyline at the same dosage (IM) and 1 ml (SC) respectively. Similar treatment was repeated only to piglets when they were 3, 12, and 21 days of age. They were weaned at 28 days. The piglets were weighed at 3, 28, and 56 days of age. Sows and piglets were individually observed for signs of disease daily and individual necropsy report was also recorded.

Results indicated the advantage in weight and average daily gain (ADG) significantly which measured at weaning and the end of trial in piglets treated with long acting oxytetracycline. In addition, the incidence of scours within 56 days post farrowing in treated group was significantly lower ($P<0.05$) than in the control group.

In conclusion, long acting oxytetracycline treatments were satisfactory both in terms of controlling neonatal diseases and improving production of pigs under commercial conditions.

INTRODUCTION

Swine production in Thailand is becoming intensive. Profit margins are variable but depend greatly upon efficiency of production. Two major indications of efficiency are the number of pigs weaned per sow per year and the rate of weight gain. Gastro-intestinal diseases have a profound effect on both these factors through death loss or reduced efficiency in growth and feed conversion.

One important practice of many preventive medicine programmes is the administration of antibiotics via feeds, drinking water, or parenterally. Studies have proven conclusively that growing pigs fed rations containing low levels of certain antibiotics gain weight faster and more efficiently than non-medicated controls. They also experience a lower incidence of disease. It is well accepted that under normal conditions, one of the most stressful periods for a sow and her piglets is farrowing and the ensuing neonatal period.

Oxytetracycline (OTC) with long acting property was shown by Cornwell (1980) to be effective for 96 hours post treatment. Our previous reports on using long acting oxytetracycline when given to sows prior to or within 24 hours of farrowing for prophylaxis of M.M.A. syndrome in sows (Chantaraprateep *et al.*, 1983 a) and prevention of M.M.A. syndrome in sows and scours in piglets (Chantaraprateep *et al.*, 1983 b) when given to sows at farrowing and piglets on the third day of life proved to be more effective than untreated controls. However, the incidence of scours of piglets from day 1 to 21 was still high and consequently resulted in poor performance of the piglets. Furthermore, our recent report indicated that morbidity and mortality due to scours in piglets up to 4 days old in a piggery in Chon Buri were 21-25% and 7% respectively.

The present investigation was aimed to test the effectiveness of periodic OTC long acting treatments for controlling neonatal diseases and improving production of pigs under commercial conditions.

MATERIAL AND METHOD

Animal

Eighty crossbred (Y x L), in late gestation sows belonging to a commercial farm in Nakhon Pathom province were selected.

Product

Oxytetracycline long acting 200 mg/ml.*

Procedure

1) The 80 sows were randomly allocated into 2 equal groups at time of farrowing.

2) Sows had been maintained on non-medicated feed until being administered treatment, as specified in the design (one week prior to expected farrowing and continued up to one week post farrowing).

3) Piglets that were unthrifty on day 3 were treated the same as litter mates, but not included in the experiment. They had needle teeth cut and iron injections administered simultaneously after birth.

4) On days 3, 28, and 56, piglets were individually weighed.

5) One week after weaning (at 28 days of age), treated and control piglets were transferred to two nursery pens.

6) Daily records of clinical observation and body temperature of the sows 7 days post farrowing as well as during individual treatment were taken.

Design

Group	Animal	Treatment	Dose/Route	Day of Treatment	No.
Control	Sows	Placebo*	1 ml/10 kg, IM	Farrowing (± 24 hrs)	40
	Piglets	Placebo*	1 ml/pig, SC	Days 3, 12, 21 of age	407
Treatment	Sows	OTC/LA**	1 ml/10 kg, IM	Farrowing (± 24 hrs)	40
	Piglets	OTC/LA**	1 ml/pig, SC	Days 3, 12, 21 of age	407

* *Distilled water*

** *Oxytetracycline long acting 200 mg/ml.*

Data collection and analysis

The following data were recorded :

1) Farrowing complications, number of live births, still births, and mummified foetuses.

2) Individual piglet body weight at 3, 28, and 56 days of age.

3) Clinical observation for signs of sickness.

4) Necropsy was done to determine cause of death.

This trial was carried out during April to July 1984. Students't test was employed to determine the difference between mean, and proportion test was used to rectify the difference between rate and proportion (Snedecor and Cochran, 1980).

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* *Terramycin/LA® Lot 30262 : Pfizer.*

RESULTS

Average gestation period of 113.4 and 114.0 days was found in treated and control sows respectively.

Farrowing complications, i.e., manual assistance and calcium gluconate administration, in 75% of OTC/LA treated sows were comparable to the 65% in untreated sows.

Litter size between the treated and control groups was approximately equal (12.4 vs. 11.5 piglets/sow).

Mummified foetuses were nearly equal, that is, 5.0% and 5.4% in treated and control animals respectively.

Still births in OTC/LA treated sows (6.5%) when compared to non-medicated sows (3.9%) were not statistically different.

Piglets born alive were 88.5% in treated group, while 90.7% were found in control group, as shown in table 1.

Table 1 *Performance of sows at farrowing*

Traits	Treatment		p-value
	OTC/LA	Control	
No. of sows	40	40	
Gestation period (days)	113.4 ± 1.4 (111 - 117)	114.0 ± 1.8 (110 - 117)	NS
Farrowing complications, %	75	65	NS
Litter size (piglets/sow)	12.4 ± 2.4 (6 - 17)	11.5 ± 2.9 (3 - 17)	NS
Mummified foetus, %	5.0	5.4	NS
Still births, %	6.5	3.9	NS
Live births, %	88.5	90.7	NS

Table 2 *Performance of pigs through the trial*

Traits	Treatment		p-value
	OTC/LA	Control	
No. of piglets	407	407	
Weight (kg/pig)			
day 3	1.5 ± 0.3	1.6 ± 0.3	NS
day 28	5.3 ± 1.3	5.1 ± 1.3	$p < 0.05$
day 56	13.5 ± 2.5	12.8 ± 2.8	$p < 0.01$
ADG (g/day/pig)			
28 days	151.6 ± 45.0	139.0 ± 45.1	$p < 0.01$
index	109.1	100.0	
56 days	289.7 ± 60.8	272.2 ± 72.3	$p < 0.05$
index	104.6	100.0	
Incidence of scours, % (28 days)	46.9	64.6	$p < 0.01$
Survival rate, % (28 days)	94.8	96.8	NS
Survival rate, % (56 days)	91.4	94.8	NS

Three-day old piglets of about 1.5 and 1.6 kg body weight in treated and control groups respectively were not statistically different, but at 28 and 56 days old, treated piglets performed significantly better in terms of body weight than untreated piglets (table 2)

Average daily gain (ADG) in 28-day old, treated piglets (151.6 g/day) surpassed controls (139.0 g/day) significantly ($P < 0.01$). Moreover, ADG in 56-day old, OTC/LA treated piglets (289.7 g/day) was 4.6% better than control piglets (274.2 g/day) significantly ($P \leq 0.05$).

Forty-seven per cent of OTC/LA treated piglets developed scours within 3 to 28 days post farrowing which was significantly ($P < 0.01$) lower than the 64.6% in the control animals. During the first and second days of life, scours was recorded 1.5% and 3.4% respectively in both groups.

Morbidity rate of scours of each day after farrowing through 28 days of age comparison between treated and control piglets is shown in figure 1.

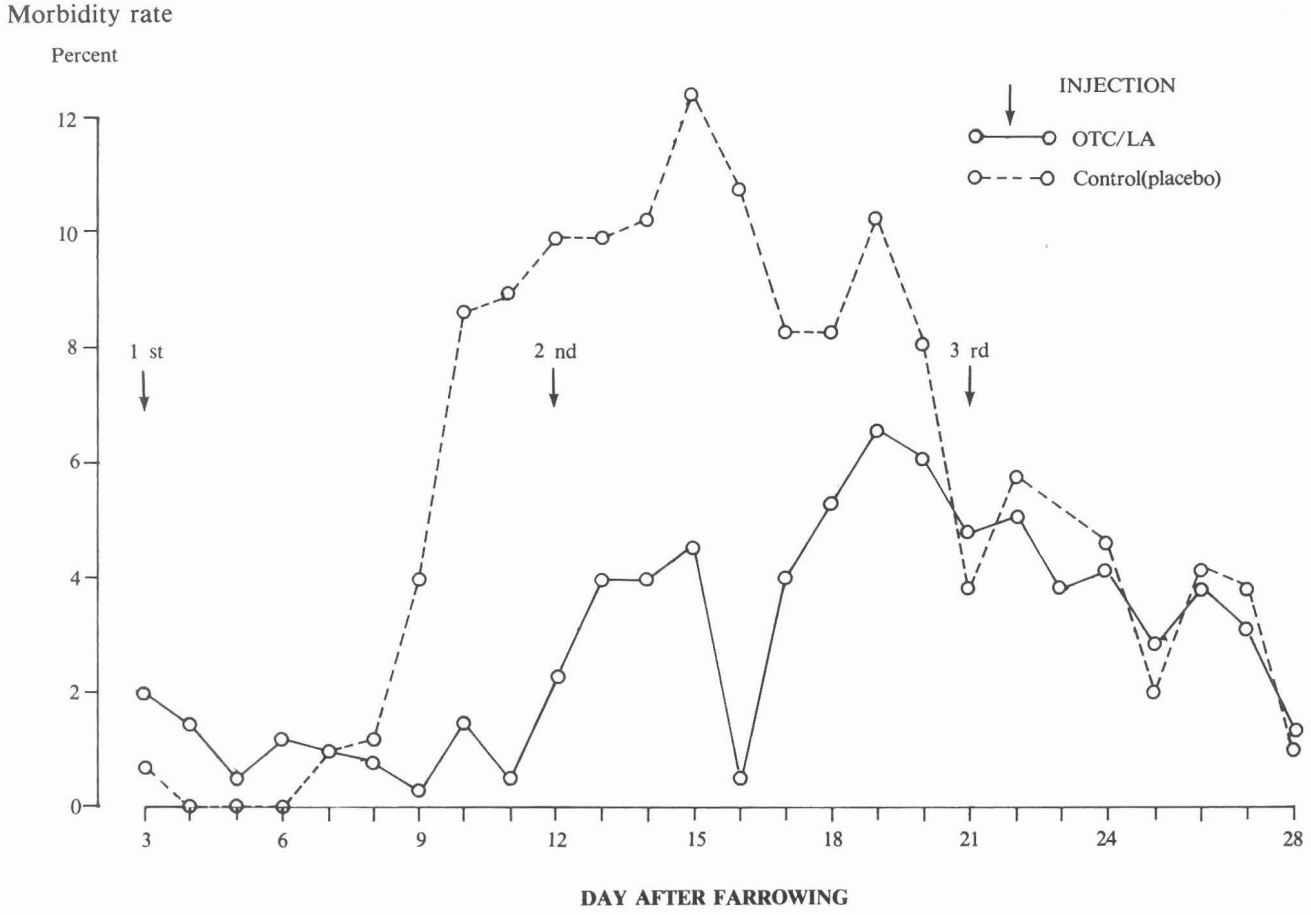

Fig. 1 **Morbidity rate (%) of scours in post farrowing piglets.**

Twenty-eight-day survival rate of OTC/LA treated piglets was 94.8% which was comparable to 96.8% in control piglets. At 56 days, survival rate was also not significantly different between treated (91.45%) and control group (94.8%).

Cause of death by necropsy was shown in table 3.

Although majority of the sows of both groups exhibited body temperature 103°-105°F from day 1 to 7, and no symptoms of M.M.A. were observed. Body temperature changes were found 50%, 75% and 87% for the first, second, and third days post partum respectively.

Atrophic rhinitis was observed in a low grade in one animal from each group sacrificed at 60 days old.

Table 3 *Causes of death in each group*

Cause of Death	Treatment			
	OTC/LA		Control	
	No.	%	No.	%
Laid on	21	60.0	15	71.4
Respiratory tract infection	3	8.6	2	9.5
Enteritis, peritonitis	4	11.4	-	-
Gingivitis	1	2.9	1	4.8
Arthritis	1	2.9	1	4.8
Haemolytic jaundice	1	2.9	-	-
Diaphragmatic hernia	1	2.9	-	-
Unknown	3	8.6	2	9.5
Total	**35**	**100.0**	**21**	**100.0**

DISCUSSION

Performance of sows at farrowing

Treatment with OTC/LA and placebo did not affect gestation period of the sows with the average of 113.4 ± 1.4 and 114 ± 1.8 days (ranged 110 to 117).

Complications during farrowing of both groups occurred similarly and they needed manual assistance together with calcium gluconate treatment. Furthermore, the treatment had no affect either in terms of litter size at birth or live births.

Performance of pigs through the trial

Body weight : At 3 days old they were similar and averaged 1.5 kg and 1.6 kg for OTC/LA and untreated control groups respectively. It was equal to our report (1.5 kg) in the similar studies. (Chantaraprateep *et al.*, 1983 b).

At day 28, average body weight of treated piglets was better (5.3 kg vs 5.1 kg) than those in the controls ($P < 0.05$). This finding indicated the result of lower incidence of scours (47% vs 64.6%) during the first 28 days of life in the treated than those in the control animals ($p < 0.01$), as shown in table 2. Stress associated with grouping, crowding, dietary change, handling by people, and unfavourable weather, or inadequate temperature control and ventilation is thought to predispose the animals to disease. The effects of scours on mucosa of intestines would result in poor performance of the pigs. At day 56, again average body weight of piglets of treated group gained more (13.5 kg vs 12.8 kg) than those in the controls ($p < 0.01$).

Average daily gain (g/day) : It was shown that ADG of OTC/LA treated animals was much better than those in the untreated controls on day 28, 151.6 vs 139.0 ($p < 0.01$) and on day 56, 289.7 vs 274.2 ($p < 0.05$), respectively. In terms of ADG index on days 28 and 56 in treated animals, they were 9.1% and 4.6% which surpassed the untreated controls.

Piglet survival on days 28 and 56 was about the same for both groups, with an average of 94.8% vs 96.8% and 91.4% vs 94.8% respectively.

Causes of death : In this study the majority of death of piglets were due to laid on for both groups studied (more than 60%). Although there were other several causes but they seemed to affect pigs in low rate for both groups. Totally from birth to 56 days old, 35 and 21 piglets died in treated and untreated groups respectively.

Despite a report by the piggery owner that the incidence of M.M.A. syndrome and atrophic rhinitis existed in the selected farm, actual incidence during the period studied was not observed in both groups. This was probably to improved management and hygiene.

ACKNOWLEDGEMENT

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