

## Laparoscopic examination and chronical venous catheterization in pig in Thailand\*

### การใช้เครื่องลาพารอสโคป และการสอดท่อเข้าในเส้นเลือดดำสุกรในประเทศไทย\*

Annop Kunavonkrit<sup>1</sup>

Chainarong Lohachit<sup>1</sup>

**บทคัดย่อ :** อรรณพ คุณาวงษ์กฤต และ ชัยณรงค์ โลหะจิต. 2530. การใช้เครื่องลาพารอสโคป และการสอดท่อเข้าในเส้นเลือดดำสุกรในประเทศไทย. วารสารวิจัยวิทยาศาสตร์การแพทย์ 1(2) : 17-22

ในการทดลองและการวิจัยทางด้านสูติกรรม และทางสูติวิทยาของระบบสืบพันธุ์ในสุกร ได้มีการนำเครื่องมือและวิธีการต่าง ๆ เช่น เครื่องลาพารอสโคป การสอดท่อเข้าในเส้นเลือดดำ มาใช้เพื่อความสะดวกและแม่นยำในการเก็บข้อมูลทางการทดลองและการวิจัย เทคโนโลยีดังกล่าวได้ใช้ในต่างประเทศจนเป็นที่ยอมรับโดยทั่วไปแล้ว จุดประสงค์ของการศึกษานี้เพื่อต้องการทดสอบดูว่า การทำลาพารอสโคปและการสอดท่อเข้าเส้นเลือดดำนี้ สภาวะแวดล้อมในประเทศไทยนี้กระทำได้หรือไม่ และจะมีผลแทรกซ้อนอย่างไร

จากการศึกษาในสุกรเพศเมีย 10 ตัว ที่ได้ทดลองทำการตรวจอวัยวะสืบพันธุ์จำนวน 40 ครั้ง โดยใช้เครื่องลาพารอสโคป และการศึกษาเพื่อดูประสิทธิภาพของการสอดท่อเข้าเส้นเลือดดำในสุกร จำนวน 8 ตัวพบว่า ไม่มีปัญหาแต่อย่างใดในการใช้ยาสลบ, การตรวจ, ผ่าตัดและสิ่งแทรกซ้อนหลังการทำ โดยเฉพาะอย่างยิ่งอายุการใช้งานของท่อเลือดดังกล่าว สามารถอยู่และใช้งานได้ยาวนานกว่า 3 สัปดาห์ ดังนั้นจึงสรุปได้ว่าวิธีการทำการตรวจอวัยวะสืบพันธุ์ โดยใช้เครื่องลาพารอสโคป และการสอดท่อเข้าเส้นเลือดดำในสุกรสาวหรือแม่สุกร สามารถจะกระทำได้ในสภาพของเขตร้อน เช่น ประเทศไทย

\* A part of this paper was presented at the 24<sup>th</sup> Annual Conference, Kasetsart University, Veterinary Medicine Section, Bangkok. January 27<sup>th</sup> - 28<sup>th</sup>, 1986.

ส่วนหนึ่งของรายงานนี้ได้เสนอต่อที่ประชุมทางวิชาการ ครั้งที่ 24 มหาวิทยาลัยเกษตรศาสตร์ สาขาสัตวแพทย์ กรุงเทพมหานคร 27-28 มกราคม 2529

<sup>1</sup> Department of Obstetrics, Gynaecology and Reproduction, Faculty of Veterinary Science, Chulalongkorn University, Bangkok 10500.

ภาควิชาสูติศาสตร์ เชนเวชวิทยาและวิทยาการสืบพันธุ์ คณะสัตวแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย กทม. 10500

**Abstract :** Annop Kunavongkrit and Chainarong Lohachit. 1987. Laparoscopic examination and chronic venous catheterization in pig in Thailand. Thai J Hlth Resch. 1(2) : 17-22

*This experiment is the first observation in Thailand which intended to determine whether the technique of laparoscopy and chronic venous catheterization in pig can be employed in tropical condition without any severe complication.*

*Forty laparoscopic examinations performed in 10 gilts showed no sign of severe complication, neither during nor after operation. Feasibility test for chronic venous catheterization performed in other 2 gilts and 6 sows was also successful. There were no complication found and the catheter could be kept patent for an average period of 3-4 weeks. Thus, both laparoscopic examination and chronic venous catheterization can be employed in pig which are rearing in the tropical condition, especially in Thailand.*

## INTRODUCTION

There are many advanced techniques employed in pig reproduction research in order to get more precise information and more comfortable in handling of experimental animals, such as laparoscopic examination, chronic venous catheterization (Rodrigues and Kunavongkrit, 1983; Kunavongkrit *et al.*, 1984). However, most of the experiments were performed in temperate or sub-temperate countries which had different condition to the tropical countries. In tropical countries like Thailand, we had different climate and environment. The methods might not be going well because of environmental stress due to hot climate and heavy infections were found more in tropical condition. Therefore, this experiment was the first observation in Thailand which intended to determine whether the techniques of laparoscopy and chronic venous catheterization in pig could be employed without any severe complication and hence could be used for advanced methodology in pig reproduction research in Thailand.

## MATERIAL AND METHODS

### EXPERIMENT 1 (Laparoscopic examination)

Ten Landrace X Yorkshire cross-bred gilts were used in this study. They were brought from commercial farms and kept at the Departmental research stable two weeks before the experiment started. They were seven months of age and about 120 kilograms of body weight. They were fed with 2 × 1.5 kg per day of the standard commercial feed and water *ad libitum*. Oestrous detection was performed once daily by an experience herd man and a boar. Laparoscopy was performed once a week for each gilts. If the gilts had no ovulation or corpora lutea at the first laparoscopy, they might be culled out. The gilts which had corpora lutea were kept for further investigation for two oestrous cycles or 6 weeks.

**Laparoscopic methods :** The animal was fast on the day of laparoscopic examination. General anaesthesia was performed by using intramuscular injection of one ml Azaperone (Stressnil) /20 kg body wt and 15 min later giving intravenous injection of one ml Metomedate (Hypnodil) /20 kg body wt. The anaesthetized animal was restrained on the dorso-ventral position on the surgical table. After four limbs were tied by leather strap, the head will be tilted down on the slope (30°) table.

The equipments used on this operation were :

- 1) Hopkins straight forward telescope, 0 wide angle, 5 mm diameter, 20 cm length.
- 2) Trocar and cannula with valve 11 mm in diameter.
- 3) A set of cold light fountain 150 watt, 220 volt including a fiber light cable.

- 4) Trocar and cannula with valve 5 mm in diameter.
- 5) A palpation probe.
- 6) A verrus pneumoperitoneum needle
- 7) CO<sub>2</sub> - Pneumoperitoneum apparatus, full automatic with CO<sub>2</sub> bottle.
- 8) A surgical blade.
- 9) A needle holder, thumb forceps and suture material.

The laparoscopic instruments were disinfected by immersion in disinfectants. The area of operation was between the last two pairs of the udder which was scrubbed using aseptic technique. Insufflation by using the verrus pneumoperitoneum needle passing through the skin and peritoneum had to perform prior to trocarization for the insertion of telescope into the abdomen. Using CO<sub>2</sub> - Pneumoperitoneum apparatus, the pressure in the abdominal cavity could be adjusted to be around 12 mm Hg. The incision site was made about 6 cm caudal to umbilicus on the midline. The size of incision was around 1-2 cm. The 11 mm trocar-cannula was inserted into the incision line at 0 angle and trocar was removed. Insertion of the telescope was made through the cannula then attached the light and gas cable to the telescope. Put the 5 mm trocar-cannula into abdomen by the body. Removed trocar and insert the palpation probe into the cannula.

Attempt to visualize the organs which had to be investigated with the help of the palpation probe. After the investigation, withdrawal of the cannula and evacuation of the gas out of the abdomen was done, then the incision was closed by a single suture. Antibiotic powder was applied to the incision and parenteral antibiotic was used for prophylactic measure. All the findings from laparoscopic examination was recorded. After the gilts were slaughtered, all reproductive organs were investigated macroscopically and compared with the result obtained from laparoscopy.

#### **EXPERIMENT 2 (Chronical venous catheterization)**

Two cross-bred prepubertal gilts and six multiparous late pregnant sows were used in this experiment. The experiment was conducted under farm condition. All animals were kept in an individual pen and fed with a standard commercial feed. They were divided into two groups according to the anaesthetics used as follow :

Group 1 Two prepubertal gilts and 2 of late pregnant sows

Group 2 Four late pregnant sows

The animals in group 1 were anaesthetized by using one ml Azaperone (Stressnil)/20 kg body wt, IM, followed by one ml Metomedate (Hypnodil)/20 kg body wt, IV, 15 min later. Group 2 were anaesthetized by using thiopentone sodium (Pentothal) 5 mg/ml, IV, via ear vein cannula and maintained anaesthesia by giving more thiopentone sodium when needed.

After anaesthesia, the animals were put into dorso-ventral position, exposure of the jugular vein was done by blunt cervical dissection. The vein was ligated distally to prevent backflow, a longitudinal incision (0.5 cm) was made in the wall of the vessel. An autoclaved silastic catheter (Dow Corning Co., Midland, Michigan, U.S.A. 0.04 inch ID and 0.08 inch OD) of 50-100 cm length and flushed with heparin saline (25 iu heparin per ml) was inserted into the vein for 10-20 cm. To ensure proper fixation of catheter to the vein, a single ring (2-3 mm width) of silastic tube (0.06 inch ID and 0.1 OD) was placed over the catheter at the point where it emerged from the vein incision. Two sutures over the catheterized vein and the catheter were applied to each side of the ring. The catheter was passed subcutaneously to cervical area by way of a stainless steel probe and emerged onto the skin after rotation of the animal to lateral position. The end of the catheter was connected to a two-way intravenous cannula (Venflon, Viggo, Sweden) and stitched to the skin. An easily openable canvas was sutured to the skin covered the cannula. Blood collection was performed once per day in all animals and the catheter was flushed and filled with heparinized saline between blood sampling in order to avoid clotting.

## RESULTS

### EXPERIMENT 1

No severe complications occurred during and after the forty laparoscopic examinations from 10 gilts (Table 1). Six of ten gilts (A-F) were prepubertal gilts and were culled out after one to four examinations except for one gilt, which was kept for further investigation of the feasibility of the method, had 12 examinations. This gilt (F) was not in oestrus until slaughtered. No adhesion between the uterine horns or uterine horn and abdominal wall was found in this gilt at slaughter. Another four gilts (G-J), which had at least one oestrous cycle before (judging from appearance of corpora lutea at the first laparoscopy), were examined another 4-5 times (Table 1) except for one gilt (G) which had ear necrosis due to leaking of metomedate, was culled out after the third laparoscopy. These pubertal gilt came in oestrus at the expected time for two cycles.

**Table 1** *Number of laparoscopic examinations in 10 gilts*

	Prepubertal gilts						Cycling gilts				Total
	A	B	C	D	E	F	G	H	I	J	
No. of laparoscopy	1	1	2	3	4	12	3	4	5	5	40

The duration of the examination was about 40 min. The recovery of the animals after examination was about 2 h. The repeated examination once a week did not create any problem at the site of incision. The incision perfectly healed after 7 days.

The number of corpora lutea obtained from laparoscopy or post mortem were shown in Table 2. The result revealed that there was no difference in number of corpora lutea in three gilts (H, I, J). But in gilt G which was examined during oestrus and slaughtered 5 days later had more corpora lutea at slaughter than at laparoscopy.

**Table 2** *Comparison of the number of corpora lutea counted via laparoscope and from slaughterhouse in 4 gilts.*

Gilts	Number of corpora lutea			
	Laparoscope		Slaughter	
	Right Ov.	Left Ov.	Right Ov.	Left Ov.
G	4	1	10	5
H	5	4	6	4
I	5	7	5	8
J	8	4	9	4

### EXPERIMENT 2

The duration of the operation was about 1.5 h and the recovery of the animal was about 2 h and 1 h for group 1 and group 2 respectively. All animals in group 1 were healthy and 2 of late pregnant sows farrowed at the expecting day. No severe complication was found during and after operation in this

group. The catheters were kept patent for 3 weeks in two gilts and 4 weeks in two sows. In two sows, which were lactating during experimental period, were allowed to be in contact with their piglets. Three of four late pregnant sows in group 2 aborted within 36 h after operation. Most of the piglets died because they were 7 days too early. One sow in this group farrowed at the expected day and lactating normally. No other complication was found during operation in this group. The catheters were kept patent for 4 weeks in one lactating sow and 3 weeks in another 3 sows. During the sampling period, there was no any problem due to clotting or broken catheter or two-way cannula.

## DISCUSSION

### EXPERIMENT 1

The results obtained no severe complication occurred during and after the forty laparoscopic examinations which in accordance with the previous reports (Wildt *et al.*, 1973, Kunavongkrit *et al.*, 1984). Even in gilt F which was examined 12 times within 3 months, the adhesion of the uterus to the abdominal wall or internal organs or the other complication was not found at slaughtered. The sexually mature gilts (G-J) recycled normally which confirmed the earlier experiments in Sweden which found normal oestrous cycles in gilts after several laparoscopies (Andersson and Einarsson, 1980; Karlbom *et al.*, 1982). The number of corpora lutea counting via laparoscope had a fewer in number than those from slaughter. This might be due to some corpora lutea were at the angle which could not be seen by laparoscope. However, the difference was not so much (only 8-10%) except in one gilt (G) which was examined during oestrus, the ovulation might occurred after the operation. Therefore, it can be concluded that the technique of laparoscopy used in pig under tropical condition has no problems and may be used for clinical diagnosis of reproductive organs and research without risk.

### EXPERIMENT 2

The potency of the venous catheterization in gilts and sows in this study was 4-5 weeks. The results confirmed the technique previously done in Sweden (Rodrigues and Kunavongkrit, 1983) which had almost the same results. However, the difference was on 107<sup>th</sup> day pregnant sows (3 of 4) were aborted within 36 h after operation, which did not occur in the other trial with the same technique, stage of pregnancy and anaesthetic used (Kunavongkrit *et al.*, 1983). The only difference was the environment and climate. Therefore, the reason for the abortion might be stress factor due to the animals recovered too soon in such condition. Since the animals in this group were anaesthetized with a short acting thiopentone while the other group which was not aborted using another anaesthetics which prolonged recovery time.

It can be concluded that the technique of venous catheterization can be used in tropical condition without any serious infection and kept patent for an average of 3-4 weeks. Due to the environment or stress condition, the method of anaesthesia must be caution to prevent complication which may happen when operate the pregnant animals e.g. abortion.

## ACKNOWLEDGEMENTS

This work was supported by the International Foundation for Science Grant No. B/769-1. The authors wish to thank Drs. K. Tanskul, S. Rojasavastain and C. Chaosirigul for their excellent assistance (experiment 1) and Dr. S. Siricoon for his kind co-operation (experiment 2).

**REFERENCES**

- Andersson A M and Einarsson S. 1980. Studies on the oestrus and ovarian activity during five successive oestrous cycles in gilts. *Acta vet scand* 21 : 677-688.
- Karlbom I, Einarsson S. and Edqvist L E. 1982. Attainment of puberty in female pigs, Clinical appearance and pattern of progesterone, oestradiol -17 $\beta$  and LH. *Anim Reprod Sci* 4.: 301-312.
- Kunavongkrit A, Kindahl H, Einarsson S and Edqvist L E. 1983. Clinical and Endocrinological in primiparous zero-weaned sow : 1. Clinical and morphological findings with special reference to the effect of PGF -2 alpha treatment. *Zbl Vet Med A* 30 : 607-615.
- Kunavongkrit A, Kindahl H and Andersson A M. 1984. Laparoscopy in post partum sows with special emphasis on the effects of uterine manipulation on the release of prostaglandin F 2-alpha. *Res Vet Sci* 36 : 66-70.
- Rodrigues H and Kunavongkrit A. 1983. Chronical venous catheterization for frequent blood sampling in unrestrained pigs. *Acta vet scand* 24 : 318-320.
- Wildt D E, Fujimoto S, Spencer J L and Dukelow W R. 1973. Direct ovarian observation in the pig by means of laparoscopy. *J Reprod Fert* 35 : 541-543.