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นิพนธ์ต้นฉบับ

Ovarian activities and abnormalities in slaughtered gilts*

การทำงานตามปกติและความผิดปกติของรังไข่ในสุกรสาวจากโรงฆ่าสัตว์*

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บทคัดย่อ : **อรรณพ คุณาวงษ์กฤต, พีระศักดิ์ จันทร์ประทีป, ประเสริฐ ประทีป และ ปิยลัมพร พุ่มสุวรรณ. 2530. การทำงานตามปกติและความผิดปกติของรังไข่ในสุกรสาวจากโรงฆ่าสัตว์. วารสารวิจัยวิทยาศาสตร์การแพทย์ 1 (2) : 9-14**

จากการตรวจอวัยวะสืบพันธุ์ของสุกรสาว จากโรงฆ่าสัตว์จำนวน 1,000 ตัว พบว่าสุกร 164 ตัว มีความผิดปกติของอวัยวะสืบพันธุ์ โดยเป็นกระเทย 0.2% มดลูกไม่ครบ 0.3% ความผิดปกติของท่อนำไข่ 3.9% ท่อนำไข่มีน้ำ 0.1% รังไข่เป็นถุงน้ำ 5.7% ก้อนเหลืองในรังไข่เป็นถุงน้ำ 7.0%

ในสุกรที่มีอวัยวะสืบพันธุ์ปกติ (จำนวน 836 ตัว) โดยแบ่งเป็น 2 กลุ่มใหญ่ ๆ คือ กลุ่มที่ยังไม่เคยมีการตกไข่ และกลุ่มที่เคยมีการตกไข่อย่างน้อย 1 ครั้ง สำหรับในกลุ่มแรกพบว่า 151 ตัวยังไม่มีการตกของไข่และรังไข่ยังไม่ทำงาน 42 ตัวยังไม่มีการตกไข่แต่มีถุงหุ้มไข่ขนาดใหญ่ 144 ตัวยังไม่มีการตกไข่และมีถุงหุ้มไข่ขนาดเล็ก ในกลุ่มที่มีการตกไข่มาแล้วอย่างน้อย 1 ครั้ง มี 63 ตัวที่มีถุงหุ้มไข่ขนาดใหญ่ และ 436 ตัวมีถุงหุ้มไข่ขนาดเล็ก

โดยการนับจำนวนถุงหุ้มไข่ วัดขนาดรังไข่และชั่งน้ำหนัก พบว่ารังไข่ด้านซ้ายมีสภาพการทำงานดีกว่าข้างขวาอย่างมีนัยสำคัญทางสถิติในทุกสภาพของการสืบพันธุ์ และในทุกกลุ่มสุกร มดลูกในสุกรที่เคยมีการตกไข่ มีน้ำหนักมากกว่าในสุกรที่ยังไม่มีการตกไข่อย่างมีนัยสำคัญทางสถิติ ในกลุ่มสุกรที่ยังไม่มีการตกไข่ น้ำหนักของมดลูกสุกรที่มีถุงหุ้มรังไข่ขนาดใหญ่ หนักกว่ากลุ่มที่มีถุงหุ้มรังไข่ขนาดเล็ก และกลุ่มที่มีถุงหุ้มรังไข่ขนาดเล็กนี้ หนักกว่ากลุ่มที่ยังไม่มีการตกของไข่และรังไข่ยังไม่ทำงาน อย่างมีนัยสำคัญทางสถิติ

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Abstract : **Annop Kunavongkrit, Peerasak Chantaraprateep, Prasert Prateep and Piyalamporn Poomsuwan. 1987. Ovarian activities and abnormalities in slaughtered gilts. Thai J Hlth Resch 1(2) : 9-14**

One thousand nonparous, crossbred gilts were used in this study. They were slaughtered and all reproductive organs were collected and examined. Abnormalities of the reproductive tracts, ovaries occurrence and number of corpora lutea and follicles of diameter more than 5 mm in ovaries were recorded. They were classified to two categories, normal and abnormal. The normal group was divided into 2 groups, prepubertal and sexually mature gilts according to the appearance of corpora lutea.

There were 836 and 164 gilts in the normal and abnormal groups respectively. The abnormal group consisted of true hermaphrodite (0.2%), uterine imperfecta (0.3%), oviduct diverticularization (3.9%), hydrosalphinx (0.1%), follicular cysts (5.6%) and cystic corpora lutea (7.0%). Among the normal gilts, there were 337 prepubertal gilts (40.3%) and 499 sexually mature gilts (59.7%). The physiological data revealed the left ovaries were more active than the right for all reproductive stages and in the aspect of weight, size of the ovaries and number of follicles. The weight of the uterus in the sexually mature gilts was significantly heavier than the prepubertal group.

INTRODUCTION

Although the pig is a relatively fertile animal, abnormalities of overies and other reproductive organs will cause impaired fertility or sterility. Rearing of pigs in tropical countries is a difficult task due to more susceptibilty of pig to hot climate, absence of sweat glands and excessive subcutaneous fat deposition which prevent heat dissipitation from body. Therefore, tropical environment might adversely effect reproductive performance in pigs. Reports concerning ovarian activities and abnormalities have mostly done in the temperate countries (Perry and Pommery, 1956 ; Einarsson and Gustafsson, 1970) but no comprehensive investigation in this field has previously been carried out in Thailand.

The purpose of this investigation was to study the incidence of ovarian abnormalities and the physiological data of ovarian activities in slaughtered gilts in the tropical area.

MATERIAL AND METHODS

Altogether 1000 crossbred gilts (Yorkshire x Landrace x Duroc) were included in the study. They were brought for slaughtering at the provincial slaughter house. All of them were nonparous swine with a body weight of 100-120 kg and about 7.5 months of age. Immediately after slaughtering, ovaries and oviducts were collected and labelled for identification. Uterus and cervix were removed and weighed without open inside. Ovaries, bursae and oviducts were inspected and examined 6 h later. Abnormalities of the ovaries and oviducts, occurence and number of corpora lutea and follicles of diameter more than 5 mm in ovaries were recorded. The ovaries were separated along the attachment of the mesovarium, measured and weighed.

Classification of reproductive organs was as follow :

1) Abnormalities found in the ovaries, oviducts, bursae or uterus were classified as the ABNORMAL GROUP (except par-ovarian cyst was not included in this group)

2) No abnormalities found in ovaries, oviducts, bursae or uterus were classified as the NORMAL GROUP. The normal group was divided into the PREPUBERAL GROUP (the group which had not yet had any ovulation) and the SEXUALLY MATURE GROUP (the group which had one or more ovulations).

All data were analysed with conventional statistical methods (Snedecor and Cochran, 1980) as follow : the comparison between right and left ovaries was done using "Paired t-test". Analysis of varience was used for comparison among the different reproductive stages. If significant, Duncan's Multiple range test was applied to test the significance between each group.

RESULTS

Developmental abnormalities

The number and frequency of the abnormalities of the reproductive organs are summarized in the Table 1.

Table 1. *Incidence of abnormalities from 1000 reproductive organs in slaughtered crossbred gilts.*

Diagnosis	Number of cases	%
True hermaphroditism	2	0.2
Uterine imperfecta	3	0.3
Oviduct		
Local diverticularization of the oviduct	39*	3.9
Hydrosalphinx	1	0.1
Ovaries		
Follicular cysts	56*	5.6
Cystic corpora lutea	70*	7.0

* *Some animals (55 gilts) had combination of the abnormalities.*

As the evident from Table 1, two of 1000 examined gilts' organs were hermaphrodites. These two cases had identified as the true hermaphrodites in which they had ovarian and testicular tissues in both gonads (ovo-testis). One of the gonad had a cystic like structure on the surface of the ovarian tissue. The gonads had been confirmed by microscopically for the testicular and ovarian structures. The findings revealed total absence of spermatozoa in the seminiferous tubules in the testicular part. The other parts of the reproductive organs were female and well developed except for the oviducts. Instead of the structure of real oviducts, there was the blind end of the uterine horn near the gonads.

Three cases (0.3%) of uterine imperfecta were recorded. All of them were unilateral. Two of them were localized to the left horn and the other was the right.

Local diverticularization of the oviduct which could lowered fertility were found 3.9% (39 cases). The incidence were 20 and 18 cases in the right and the left oviducts respectively. Only one gilt which had both sides defects was recorded.

In one gilt (0.1%) having bilateral hydrosalphinx was observed. Fifty-six cases (5.6%) of ovarian follicular cysts were recorded (20, 26 and 10 cases for the right, left and both ovaries repectively). Most of them were multiple cysts and diameter larger than 10 mm.

Seven percents (70 cases) of cystic corpora lutea were observed with 53 cases were unilateral (23 and 30 cases for the right and left ovaries) and 17 cases were bilateral.

The number of cysts in the mesosalphinx (par-ovarian cysts) were high. Two hundred and thirty-five cases (23.5%) were found while 29 of them were bilateral. Two hundred and six cases were unilateral while 128 cases were at the right side.

Prepuberal and sexually mature gilts' physiological data

Four hundred and ninety-nine (59.7%) out of 836 normal gilts were sexual maturation and 337 (40.3%) were prepuberty.

The comparisons of the weight, size of the right and left ovaries and the weight of the uterus in the prepuberal gilts and sexually mature gilts were presented in Table 2. The left ovaries of both prepuberal and sexually mature gilts in all reproductive status was significantly heavier, wider and thicker than the right.

Table 2. *Statistical comparison of the left and right ovaries in crossbred gilts.*

Ovaries	Prepubertal gilts (n= 337)		Sexually mature gilts (n=499)	
	left	right	left	right
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Weight (gm)	3.29 ± 0.85[a]	3.00 ± 0.80[b]	6.52 ± 2.57[c]	6.16 ± 2.71[d]
Width (cm)	1.85 ± 0.30[a]	1.73 ± 0.27[b]	2.28 ± 0.46[a]	2.16 ± 0.44[b]
Length (cm)	2.55 ± 0.36	2.50 ± 0.38	3.26 ± 0.60	3.21 ± 0.57
Thickness (cm)	1.08 ± 0.22[c]	1.04 ± 0.19[d]	1.50 ± 0.36[e]	1.45 ± 0.35[f]

[a,b] *were differ significantly* ($p < 0.001$)
[c,d] *were differ significantly* ($p < 0.01$)
[e,f] *were differ significantly* ($p < 0.05$)

The left ovaries also contained more follicles and corpora lutea than the right ovaries.

The weight of the uterus in the sexually mature gilts was significantly heavier ($p < 0.01$) than the prepubertal gilts. Among the prepubertal gilts, the weight of uterus in gilts with big follicle was significantly heavier than in gilts with small follicle ($p < 0.01$) and gilts with small follicles had significantly heavier than in gilts with inactive ovaries ($p < .01$) (see Table 3).

Table 3. *The weight of uterus in different reproductive stages in crossbred gilts*

Groups		Weight of Uterus (gm) Mean ± SD
Prepubertal gilts		
Inactive ovaries	(n = 151)	223.85 ± 84.56[a]
Active ovaries with small follicles	(n = 144)	308.17 ± 114.20[b]
Active ovaries with big follicles	(n = 42)	595.15 ± 172.63[c]
Sexually mature gilts	(n = 499)	789.27 ± 219.10[d]

a,b or b,c or b,d or c,d or d,a were differ significantly ($p < 0.01$)

DISCUSSION

The total number of defects of the reproductive organs found in the present study was 16.4%. Par-ovarian cysts (23.5%) were not included in this figure.

The frequency of hermaphroditism was 0.2% which is in accordance with the figure given by Einarsson and Gustafsson (1970). In both cases there were not possible to make clinical diagnosis before slaughter since the changes of the external genitalia was not clear.

Missing uterine horn (uterine imperfecta) was 0.3% which in accordance with Wiggin *et al.* (1950) and Einarsson and Gustafsson (1970).

Another abnormalities of the uterus, cervix and vagina such as partial or complete duplication of vagina or cervix were not recorded. These might due to the method used, which did not open the reproductive tract for detailed investigation.

Four percent of oviductal abnormalities were observed. Local diverticularization of the oviducts were responsible for 3.9% and hydrosalphinx for 0.1%. The frequency of abnormalities of the oviduct was slightly higher than those reported by Einarsson and Gustafsson (1970). However, it was not as common cases as the report reported by Nalbandov (1964).

Large number of par-ovarian cysts were recorded. Par-ovarian cysts or cysts localized on meso-salphinx do not impair fertility (Wiggin *et al.,* 1950) and we have the same openion. Therefore, the cases of par-ovarian cysts are not included. However, Einarsson and Gustafsson (1970) assumed that par-ovarian cysts with diameter of more than 10 mm and localized to infundibulum or its fimbria can cause reduced fertility. The 94 cases (9.4%) of par-ovarian cysts obtained having the diameter of more than 10 mm and only few of them (14 cases or 1.4%) were localized near or to infundibulum. The frequency of this abnormality is in accordance with Einarsson and Gustafsson (1970).

Ovarian cystic degeneration were recorded in high frequency (5.6% for follicular cysts and 7.0% for cystic corpora lutea). Follicular cysts might impair fertility and might develope to be anoestral condition later. The significance of the high frequency of cystic corpora lutea in pig is not known, but they can be observed both from the pregnant sows and from gilts (Einarsson and Gustafsson, 1970). Therefore, it is likely that no influence to fertility in pig.

The left ovaries were heavier than the right in both sexually mature and prepuberal gilts. The left ovaries also contained more follicles and corpora lutea than the right. The size of the left ovary was also wider and thicker than that of the right almost at all stages of reproductive cycle except for the length of the ovary. Accordingly, there are indications that the left ovary is more active (in aspect of weight, size and number of follicles or corpora lutea) than the right. This is in accordance with previously investigations (Einarsson and Gustafsson, 1970 ; Roberts, 1971 ; Kunavongkrit and Larsson, 1982).

The constant length of the ovaries in both sides at all stages of reproductive cycle indicates the activity of the ovarian surface which active more at anterior, posterior surface and also at free border of the ovaries instead of the medial or lateral poles of the ovaries.

The weight of the uterus of sexually mature gilts were heavier than prepubertal gilts and when the gilts had bigger follicles. This depending on the stimulation of the hormones when they were mature and the big follicles which increase the weight of the uterus. This is in agreement with the results from Dyck (1971) who reported that uterine weight increased significantly from the first to the second oestrus following puberty.

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REFERENCES

Dyck GW. 1971. Ovulation rate and weight of the reproductive organs of Yorkshire and Locombe swine. Can J Anim Sci 5 : 141-146.

Einarsson S and Gustafsson B. 1970. Development abnormalities of female sexual organs in swine : A post-mortem examination of the genital tract in 1,000 gilts. Acta vet scand 11 : 427-442.

Kunavongkrit A and Larsson K. 1982. Ovulation rate and embryonic migration in cross-bred gilts. Nord Vet Med 34 : 20-24.

Nalbandov AV. 1964. Anatomic and endocrine causes of sterility in female swine. Fert and Steril 3 : 100-120.

Perry JS and Pommery RW. 1956. Abnormalities of the reproductive tract of the sow. J Agri Sci 47 : 238-248.

Roberts SJ. 1971. Veterinary obstetrics and genital diseases. Edwards Brothers Inc, Ithaca, New York, USA,

Snedecor GW and Cochran WG. 1980. Statistical method, 7th Ed, the Iowa State Univ Press, Ames, Iowa, USA.

Wiggins EL, Casida LE and Grummer RH. 1950. The incidence of the female genital abnormalities of swine. J Anim Sci 9 : 269-276.