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Peerasak Chantaraprateep

Prasert Prateep

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Study on Boar Infertilities : Epididymal Dysfunction*

*Annop Kunavongkrit B.Sc., D.V.M., Ph.D., F.R.V.C.S.***

*Peerasak Chantaraprateep D.V.M., DTVM, M, Sci. Vet.,
F.R.V.A.C.***

*Prasert Prateep B.Sc.**

Summary

Epididymal dysfunction causes infertility or lowering of the fertility in male animal. However, no corresponding investigation of epididymal dysfunction in boars have been reported in Thailand. By clinical and semen examination of 277 boars from 11 farms at Nakorn-Pathom province being examined during January 1985 to August 1986, 4 were diagnosed as epididymal dysfunction. Poor sperm motility $\{15.4 \pm 4.7\}$ and a very high incidence of single bent tail $\{53.9 \pm 15.4\}$ were found in all those four boars while semen volume, sperm concentration and other sperm morphology were comparable to normal boar semen picture. The testicles and epididymides were histologically normal. One defected boar was tested for fertility by mating to three sows but all sows were not conceived.

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** Department of Obstetrics, Gynaecology and Reproduction, Faculty of Veterinary Science, Chulalongkorn University.

Introduction

The changes of the semen picture in the male animals are often related to a disorder of the testicular function. However, loss of sperm vitality and sperm defect may arise not only from the disorder of the testicular function but also the epididymis. The case of epididymal dysfunction, a relationship between the appearance of lowered motility of spermatozoa in combination with an increased number of sperm tail abnormalities and an abnormal composition of the epididymal plasma was reported in bulls (Gustafsson 1965, 1966; Gustafsson *et al.*, 1972) as well as a case of epididymal dysfunction in a boar (Einarsson and Gustafsson, 1973). No corresponding investigation of epididymal dysfunction in boars have been reported in Thailand.

This present investigation concerns the clinical and morphological studies of four boars being diagnosed as epididymal dysfunction.

Material and Methods

Case History

Semen evaluations were performed in 11 farms which used the alternate mating system (breeding a sow to different boars during an oestrous period) to find out the defected boars in the herd which suppose to exist. Two hundred and seventy-seven boars were examined during the period from January 1985 to August 1986. All boars were not able to obtain their fertility history. They were examined at least once, if the semen picture was not good they were subjected to re-examine for another 2-3 times, then the conclusion of the findings was made.

Collection and Examination of the Whole Semen

The semen was collected by using hand-gloved method and a dummy sows. The collection was done in a plastic thermos covered with the double gauze for filtered off the bulbourethral gland secretion. Immediately after collection, sperm motility was estimated with fresh

semen under a cover slip. The sperm concentration was estimated in a haemocytometer while sperm morphology was studied with the phase contrast microscope in wet preparations of semen diluted with buffered formal saline (Bane, 1961). Light microscopy was used for head abnormalities investigation on stained smear.

Clinical investigations and Post-Mortem Examination

Before semen collection was performed, clinical examination of the boar was done especially the examination of the reproductive system. Testicles and epididymis were carefully inspected and palpated. The results of the semen evaluation were considered and discussed together with those clinical findings. To confirm the findings, the suspected boar was tested for the fertility by breeding with another 3 sows and observed for the returned rates. Following the termination of the case, all the problem boars were slaughtered

and reproductive organs were collected for macroscopic and microscopic examinations. Differences of the mean were tested using unpaired Student's t test (Snedecor and Cochran, 1980).

Results and Discussion

Four out of 277 boars examined (1.44%) were diagnosed as epididymal dysfunction boars. They were 1 Spotted-Poland China (S), 2 Landrace (L1, L2) and 1 Duroc (D) boars and they belonged to four different farms. These animals were examined 3, 4, 2 and 1 times for boars S, L1, L2 and D, respectively. The first 3 boars (S, L1 and L2), were completely examined under our protocol while boar D was sent to slaughter after only one examination because semen picture was identical to those of the previous three boars. The mean and standard deviation ($\bar{X} \pm S.D.$) of the semen picture of these four boars was presented in comparison to normal ones (30 boars) collected from the 11 farms, as shown in Table 1.

The volume of the semen, sperm concentration, pH and head abnormalities were in the normal ranges when compared with those of the normal boars semen picture. However, the four boars possessed very low sperm motility together with high abnormalities of sperm tail (Single bent tail and coiled tail) when compared with those normal ones ($P < 0.001$). These results in term of bent tail (36-77%) were in accordance with the results reported by Einarsson and Gustafsson (1973) 62.5% and 70% (Bonte *et al.*, 1978) but much lower in term of motility (12-22%) when compared with 42% (Einarsson and Gustafsson, 1973) of epididymal dysfunction boar. The histological examination of testicular and epididymides tissues of three boars were found normal which also confirmed the finding of Einarsson and Gustafsson (1973) who reported that the testicles and epididymides of the epididymal dysfunction boar were histologically normal. Furthermore, it has been proved that the tail defects of sperm

originated from the epididymides and not from the testes (Bonte *et al.*, 1978). One boar (S) was tested for his fertility ability by breeding with 3 sows and they were not conceived. These findings indicated that epididymal dysfunction in boars might be infertile. However, Gustafsson *et al.* (1972) reported in bull with epididymal dysfunction but found only a slight lowering of the fertility. It was proved that normal sperm cells reached the tip of the uterine horn earlier than those with tail abnormalities (Bonte *et al.*, 1978). Thus, it is not possible at the moment to draw any conclusion concerning the fertility in epididymal dysfunction boars in this study, since we had tested the fertility of one boar only. However, it is worth mentioned that in the case of epididymal dysfunction in boar it may be infertile or lowering of the fertility.

The genuine disorders of the epididymal dysfunction are not well established. However,

Table 1. Semen picture of epididymal dysfunction boars (n = 4) and normal boars (n = 30) (mean \pm standard deviation and ranges).

	Epididymal dysfunction boars (range)	Normal boars (range)
Volume	151.1 \pm 43.5 (90-205)	170.3 \pm 65.6 (60-300)
pH	7.2 \pm 0.1 (7.0-7.3)	7.2 \pm 0.3 (7.0-8.0)
Motility (%) a)	15.4 \pm 4.7 (12.5-22.5) b)	74.3 \pm 9.6 (55.0-90.0)
Sperm Conc. $\times 10^6$ /ml.)	317.8 \pm 37.6 (276-358)	341.3 \pm 137.1 (42-600)
<u>Wet preparation (Buffer formal saline) (%)</u>		
Prox. Cyto. Droplet.	4.9 \pm 4.2 (1.5-11.8)	3.1 \pm 2.6 (0.0-9.5)
Dist. Cyto. Droplet.	6.5 \pm 4.4 (0.5-12.8)	1.9 \pm 1.7 (0.0-5.5)
Single Bent Tail a)	53.9 \pm 15.4 (36.5-77.3) b)	1.1 \pm 1.3 (0.0-5.5)
Coiled Tail c)	4.4 \pm 3.2 (0.0-9.0) d)	0.4 \pm 0.9 (0.0-4.5)
Loosed Head	0.1 \pm 0.1 (0.0-0.3)	0.2 \pm 0.4 (0.0-1.5)
Normal sperm a)	29.9 \pm 18.1 (4.5-48.5) b)	93.4 \pm 3.4 (84.0-99.5)
<u>Dry preparation (Stained smear for sperm head abnormalities) (%)</u>		
Narrow head	2.3 \pm 1.1 (0.5-3.1)	4.1 \pm 2.5 (0.0-12.0)
Pear-shape	0.9 \pm 0.3 (0.5-1.1)	1.3 \pm 1.3 (0.0-5.0)
Giant & small head	0.7 \pm 0.5 (0.0-1.3)	1.1 \pm 1.2 (0.0-5.0)
Abaxial	0.3 \pm 0.4 (0.0-1.0)	0.7 \pm 1.5 (0.0-6.4)
Loosed abnor. head	0.3 \pm 0.2 (0.0-0.5)	0.6 \pm 0.8 (0.0-3.7)
Normal sperm head	95.7 \pm 1.5 (93.9-97.7)	92.5 \pm 3.8 (82.0-98.5)

a and b significant different (P < 0.001)

c and d significant different (P < 0.001)

the deviation of the epididymal contents from the normal suggested that there would be the morphological changes of the spermatozoa (Einarsson and Gustafsson, 1973). As well as the deviation of osmotic pressure of the caput and cauda epididymidis which was less than in the normal boars (Einarsson and Gustafsson, 1973) might play an important role for the changes of the sperm morphology which lead to the lowering of sperm motility. However, the nature of the epididymal dysfunction in boars seems to be complex and need more further study.

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บทย่อ

การศึกษาปัญหาผสมไม่ติดในพ่อสุกร : ความผิดปกติ ของอภิตติไคมีส*

อรรณพ คุณาวงษ์กฤต** วท.บ. สฟ.บ., *Ph.D., F.R.V.C.S.*
 พระศักดิ์ จันทร์ประทีป** สฟ.บ. *DTVM, M. Sci. Vet., F.R.V.A.C.*
 ประเสริฐ ประทีป** วท.บ.

ความผิดปกติของอภิตติไคมีสในพ่อสุกร ยังไม่เคยมีรายงานมาก่อนในประเทศไทย ซึ่งเป็นสาเหตุหนึ่งที่ทำให้เกิดการผสมไม่ติด หรือมีอัตราผสมติดต่ำในสุกร จากการตรวจพ่อสุกร 277 ตัว ทั้งทางคลินิกและห้องปฏิบัติการจาก 11 ฟาร์ม บริเวณจังหวัดนครปฐม ในช่วงตั้งแต่เดือน มกราคม 2528 ถึง สิงหาคม 2529 พบว่ามีพ่อสุกรที่ได้รับการวินิจฉัยว่า มีความผิดปกติของอภิตติไคมีส 4 ตัว โดยมีลักษณะที่บ่งชี้ชัดเจนว่า เป็นโรคนี้คือ การเคลื่อนไหวเฉพาะตัวของอสุจิ มีเปอร์เซ็นต์ต่ำมาก ($15.4 \pm 4.7\%$) และมีความผิดปกติของตัวอสุจิ โดยเฉพาะส่วนหางสูงมาก ($53.9 \pm 15.4\%$) ส่วนปริมาตรของน้ำเชื้อ ความเป็นกรด-ด่าง ความเข้มข้นของตัวอสุจิต่อ ลบ.ซม. และรูปร่างอื่น ๆ ของตัวอสุจิอยู่ในเกณฑ์ปกติ เมื่อเทียบกับน้ำเชื้อจากพ่อสุกรปกติ 30 พ่อจากแหล่งเดียวกัน การตรวจลูกอ๊อดและอภิตติไคมีสในพ่อสุกรทั้ง 4 ตัว ทั้งก่อนการตรวจน้ำเชื้อและหลังส่งโรงฆ่าทางกล้องจุลทัศน์ พบว่าลูกอ๊อดและอภิตติไคมีส มีสภาพปกติ จากการทดสอบการผสมติดโดยนำพ่อสุกร 1 ใน 4 ตัวนี้ ไปผสมพันธุ์กับแม่สุกร 3 ตัว พบว่าแม่สุกรทั้ง 3 ตัว ผสมไม่ติด

* เสนอที่การประชุมวิชาการครั้งที่ 25 มหาวิทยาลัยเกษตรศาสตร์
 สาขาสัตวแพทย์ 3 - 4 กุมภาพันธ์ 2530

** ภาควิชาสัตวศาสตร์ ฐานเวชวิทยาและวิทยาการสืบพันธุ์
 คณะสัตวแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย