

## EXPERIMENTAL INDUCTION OF CYSTIC OVARIES IN SWINE BY INJECTION OF HUMAN CHORIONIC GONADOTROPIN (HCG)

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It has been reported that cystic ovaries in swine can be induced experimentally by administration of ACTH (Liptrap, 1970 ; Close and Liptrap, 1975 ; Liptrap and McNally, 1977), progesterone (Ulberg et al., 1951 ; Barker et al., 1954) or indomethacin (Ainsworth et al., 1979). The present authors (Kawata and Tomizawa, 1980) suggested that HCG also seems to be potent to induce cystic ovaries in swine.

This paper deals with the effects of HCG administered to cyclic or non-cyclic pigs on ovarian morphology and serum concentrations of progesterone (P) and estrogens ( $E = E_1 + E_2$ ).

Fourteen sows and two gilts were allotted to several experimental groups as described below. Blood samples (10 ml) were taken from *Vena cava cranialis* before and during the course of experiment every day or 2-3 days apart. The blood was placed for 2 hours at room temperature and then centrifuged (3,000 rpm, 10 minutes). Sera obtained were kept at -20°C until steroid assay was carried out. The serum P level was measured by enzyme immunoassay (Johmen et al., 1980), and the serum E level by radioimmunoassay (Makino, 1973).

Three sows in the follicular phase (Group A) were intramuscularly injected 2,000-4,000 MU of HCG. The ovaries were examined by rectal palpation during the course of the experiment. On 4.3 days on the average after the injection, the ovaries reached a small-hen-egg size, developing 5-6 cystic follicles, 1.5-2.0 cm in diameter. These cystic follicles lasted for 4.3 days, and then regressed. The estrous cycle was prolonged only 2 days. Fluctuating patterns of serum P and E levels after treatment were similar to those in the previous normal cycle.

Four sows in the luteal phase (Group B) were injected 2,000 MU of HCG. On 4.3 days after treatment, the ovaries reached a large-egg size, developing 7-9 cystic follicles, 1.5-2.5 cm in diameter and lasting for 7.0 days. The estrous cycle was prolonged for 12.0 days. The serum levels of P increased gradually and the high P level persisted for 21.0 days, then decreased. The E levels also increased during cystic period.

Three sows in the luteal phase (Group C) received a combination of 2,000 MU of HCG and 1,000 IU of PMSC. On 5.0 days after treatment, the ovaries increased in size up to a small or large egg, forming 7-9 large follicles, 1.2-2.3 cm in diameter. Some follicles ovulated without estrus and formed accessory corpora lutea, while others became cystic, lasting for 5.0 days and then regressing. The estrous cycle was prolonged for 11.0 days. Marked increases of serum P and E were seen during the cystic period.

Four sows with quiescent ovaries (Group D) were treated by 2,000-4,000 MU of HCG. On 5-8 days after treatment, the sows were slaughtered and the ovaries were examined. The ovaries reached to a large-egg size to a fist size, weighing 23-170 g. Multiple cystic follicles, 1.5-2.5 cm or more in diameter, developed. Thus, the ovaries strongly resembled to a naturally occurring case of cystic ovary.

Two immature gilts of 6 months (Group E) received 2,000-4,000 MU of HCG. Before injection of HCG, the gilts were laparotomized and examined with inactive ovaries. On 8 days after treatment they were sacrificed. The ovaries showed a large-egg size to an orange size, weighing 22-84 g. Many cystic follicles developed.

In 4 of 6 cases in Groups D and E, the serum P level increased rapidly 5 days onwards after HCG injection. However, the serum E increased slightly.

There were some luteal tissues on the induced cystic follicles and the follicular fluid contained a high level of P and a low level of E.

No estrous sign was observed in any sows or gilts during the period of induced cystic condition.

In conclusion, it is ascertain that HCG is potent to induce cystic ovaries in swine. In cyclic sows (Groups A-C) the induced cysts are relatively small and capable to recover spontaneously in a short duration, whereas in non-cyclic females (Groups D and E) the ovarian response to HCG is more drastic and typical multiple cysts can be induced. The high concentration of serum P would be due to the luteal tissues formed in the induced cysts.

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