卵胞嚢腫牛に対するLH-RH類縁化合物(TAP-031)およびピロリドン・ヨード液の治療効果と黄体化例に対するPGF2α類縁化合物(ONO-1052)の発情誘起効果

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BRIEF NOTE

Use of an Analog of Prostaglandin $F_{2\alpha}$ (ONO-1052) in Cows with Luteinized Ovarian Cysts Following Treatment with an Analog of Luteinizing Hormone-Releasing Hormone (TAP-031) and/or Polyvinyl Pyrrolidone-Iodine Solution

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Cows with follicular cysts often remain infertile. Most of the cysts may undergo luteinization, responding to some treatments with gonadotropic hormones [5, 6] or luteinizing hormone-releasing hormone (LH-RH) [1]. Thereafter, the luteinized cysts regress, follicles grow and mature, and a normal estrus returns.

In the authors' previous report [4], cows treated with an analog of LH-RH or human chorionic gonadotropin (HCG) began to show a normal estrus about 38–42 days on the average after treatment. This delayed return to the normal estrus causes a significant economical loss in dairy farming.

A recent study indicated that most of the luteinized cysts following treatment with LH-RH regressed in response to a prostaglandin $F_{2\alpha}$ ($PGF_{2\alpha}$) injection [2].

The present paper deals with the effect of an analog of $PGF_{2\alpha}$ to induce normal estrus on cows with luteinized cysts following treatment with an analog of LH-RH and/or polyvinyl pyrrolidone-iodine solution (PVP-I). PVP-I has generally been believed to be effective for treatment of cysts and clinically applied by many veterinarians in Hokkaido, although so far no exact data have been published or no mechanism of this effect have well been understood.

Thirty-nine cows with ovarian cyst were examined by rectal palpation and confirmed to show abnormal estrous signs before they were used. They have been kept at commercial dairy farms located in the southern part of Hokkaido. The cysts were characterized by the persistence of one or more large follicles, 2.0 cm or more in diameter, which remained for a week or so.

The cows were divided into 3 treatment groups, 1, 2 and 3. The average age in years of the cows and intervals in days between parturition and the onset of treatment were 4±2 (S.D.) years and 137±57 days, respectively, in group 1, 5±2 years and 124±63 days in group 2, and 8±3 years and 141±70 days in group 3.

Table 1. Induction of estrus with an analog of $PGF_{2\alpha}$ and subsequent fertility in cows with luteinized ovarian cysts following treatment with an analog of LH-RH and/or PVP-iodine

Treatment	Group 1	Group 2	Group 3	Total
	PVP-I[1]	TAP-031[2]	TAP-031+PVP-I	
No. of cows treated	12	15	12	39
No. of cows with luteinized cyst[3] injected with ONO-1052[4]	2	4	4	10
No. of cows coming into estrus and inseminated[5] within 6 days after injection with ONO-1052	2	3	3	8
No. of cows conceived after 1st insemination	1	2	2	5
No. of cows conceived after 2nd insemination	0	1	2	3
Total No. of cows conceived after injection with ONO-1052	1	3	4	8
Average interval in days between initial treatment and conception	17	25±13[6]	29±20	25±14

[1] Polyvinyl pyrrolidone-iodine solution, 50 m*l* by intrauterine infusion.

[2] An analog of luteinizing hormone-releasing hormone (Des-Gly^{10}-LH-RH-ethylamide), 400 μg by intramuscular injection.

[3] Luteinization of follicular cysts was confirmed both by rectal palpation and by determination of serum progesterone level 14 days after treatment.

[4] An analog of prostaglandin $F_{2\alpha}$, 500-1,000 μg by intramuscular injection.

[5] Artificial insemination.

[6] Mean ± S.D.

The 12 cows of group 1 were treated by an intrauterine (i.u.) infusion with 50 m*l* of PVP-I (Isodine solution, Meiji Seika Kaisha, Ltd., Tokyo). The 15 cows of group 2 were injected intramuscularly (i.m.) with 400 μg of an analog of LH-RH (Des-Gly^{10}-LH-RH-ethylamide; TAP-031) (DA-151, Takeda Chemical Industries Co., Ltd., Osaka). The 12 cows of group 3 received both i.u. infusion with 50 m*l* of PVP-I and i.m. injection with 400 μg of TAP-031.

About 14 days after treatment the cows were examined per rectum for ovarian responses. Cows in which luteinization of cysts had been declared by rectal palpation were given an i.m. injection with 500-1,000 μg of an analog of $PGF_{2\alpha}$ (ONO-1052, Ono Pharmaceutical Co., Ltd., Osaka). Animals weighing less than 500 kg were given 500 μg of ONO-1052 and those weighing more than 500 kg received 1,000 μg, except one which was injected 800 μg. The luteinized cysts once judged by rectal palpation was later confirmed by determining serum levels of progesterone. For this purpose, blood samples were taken via the jugular vein before and 14 days after treatment. Serum concentrations of progesterone were estimated by enzyme immunoassay [3].

Cows having a serum progesterone level higher than 1.0 ng/m*l* 14 days after treatment were considered to have luteinized cysts. Although 16 of the 39 cows were declared to have luteinized cysts by rectal palpation after treatment, six had a serum porgesterone level below 1.0 ng/m*l*, and ten had a level above 1.0 ng/m*l*. Of the cows in which the luteinization of cysts had been confirmed both by rectal palpation of the ovaries and by determination of serum progesterone levels, only ten were examined

for clinical responses to ONO-1052.

The number of cows having luteinized cysts 14 days after treatment and the effect of ONO-1052 on these cows are shown in Table 1. The effect of treatment with ONO-1052 did not differ significantly among the cows subjected to a different method of treatment of cysts. It was not likely for doses of ONO-1052 ranging from 500 to 1,000 μg to display an effect on the cows to induce estrus. Of 10 cows with luteinized cysts, eight began to exhibit normal estrus within 6 days after injection, one within 2 days, three within 3 days, two within 4 days, one within 5 days, and one within 6 days. All of them were inseminated artificially at the induced estrus and five of them conceived. The remaining three also conceived at the next estrus. Thus eight of the 10 cows with luteinized cysts responded to ONO-1052 and conceived within 25±14 days (S.D.) on the average after initial treatment of cysts. These results are well comparable with those previously reported by Kesler et al. [2] who applied i.m. injection with 25 mg of $PGF_{2\alpha}$ Tham salt to cows 9 days after injection with 100 μg of LH-RH.

In conclusion, the use of $PGF_{2\alpha}$ or its analog in cows with luteinized cysts 14 days after treatment with LH-RH or its analog and possibly with HCG is considered to be beneficial to shorten the interval between the treatment and conception.

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要　約

卵胞嚢腫牛に対する LH-RH 類縁化合物 (TAP-031) およびピロリドン・ヨード液の治療効果と黄体化例に対する $PGF_{2\alpha}$ 類縁化合物 (ONO-1052) の発情誘起効果 (短報)：中尾敏彦・河田啓一郎・沼田芳明 (酪農学園大学獣医学科)，飯沼真佐夫 (今金町農業共済組合)——牛卵胞嚢腫に対する黄体形成ホルモン放出ホルモン (LH-RH) 類縁化合物 (TAP-031) およびピロリドン・ヨード液 (PVP-I) による治療後14日目に，直腸検査と血中黄体ホルモン濃度の測定により卵胞嚢腫の黄体化が確認された症例10頭にプロスタグランディン (PG) $F_{2\alpha}$ 類縁化合物 (ONO-1052) を 500～1,000 μg 筋肉内注射し，その発情誘起効果を調べた．10頭中8頭で6日以内に発情が誘起され，全頭に人工授精を行ったところ，5頭が受胎した．残りの3頭は21日後に再び発情が発現し，この時の授精で受胎した．これらの8頭における卵胞嚢腫治療開始後受胎までの平均日数は 25±14 日 (S.D.) であった．