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ABSTRACT

This study was conducted to evaluate the effects of oFSH dosages on ovarian responses during superovulation treatment. A total of 35 mature crossbred goats were synchronised for oestrus with CIDR devices for a period of 13 days. The does were divided into 3 groups, namely groups M₁, M₂ and S receiving 8.8 mg and 14.1 mg of oFSH through multiple intramuscular (i.m.) injection starting from 2 days before the CIDR removal and 8.8 mg of oFSH through single i.m. injection upon CIDR removal, respectively. Ovarian responses of all treatments were evaluated during laparotomy session on days 3 or 7 after CIDR removal. All the does of group M₁ (100%, 13/13) and M₂ (100%, 9/9) responded to the treatments with at least 3 corpus luteum (CL). On the other hand, only 69% (9/13) of the does of group S responded corresponding to the treatment. The total ovarian responses (CL plus anovulatory follicles) among the treatments were significantly (P<0.05) higher in multiple administration groups (groups M₁ and M₂) than the single administration group (group S). Although no significant (P>0.05) differences were found between multiple administration groups for ovarian responses, high dosage of oFSH consistently gave higher percent ovulation and CL per doe (72.4% ± 7.6 vs. 58.8% ± 3.9 and 16.9 ± 3.9 vs. 11.6 ± 1.0, respectively) compared to low dosage. The anovulatory percentage of follicles was significantly (P<0.05) higher in group S followed by groups M₁ and M₂. The structure (embryo plus oocyte) recovery rate per doe was significantly (P<0.05) higher in group M₂ followed by group M₁ and group S (5.4 ± 2.4, 3.2 ± 1.2 and 0.5 ± 0.5, respectively). However, no significant difference (P<0.05) in the number of viable embryo in multiple administration groups (M₁; 2.4 ± 1.0, M₂; 2.0 ± 1.4, respectively) and single administration group (S; 0.1 ± 0.1). It is concluded that in multiple injection of oFSH superovulation protocol, the total dosage, breed and body weight have no effect on production of viable embryos in common goat genotype in Malaysia. Low total dosage administered in multiple injections is economically advantageous and convenient for the production of competent *in vivo* embryos. However, more detailed research is needed to optimise the amount of gonadotrophin for superovulation of Malaysian crossbred goats.

ABSTRAK

Sejumlah 35 ekor kambing kacukan digunakan untuk menilai kesan suntikan dos oFSH ke atas respons ovari semasa superovulasi. CIDR telah dimasukkan ke dalam setiap kambing betina dikaji selama 13 hari. Kambing betina dibahagikan ke dalam 3 kumpulan, iaitu 8.8 mg (kumpulan M₁), 14.1 mg (kumpulan M₂) oFSH melalui suntikan i.m. berganda bermula daripada 2 hari sebelum CIDR ditarik keluar. Respons ovari dinilai semasa sesi laparotomi yang dilakukan pada hari ke 3 atau 7 selepas tarik keluar CIDR. Semua kambing betina dari kumpulan M₁(100%, 13/13) dan M₂ (100%, 9/9) memberi respons kepada perlakuan dengan sekurang-kurangnya 3 korpus luteum (CL). Sebaliknya, hanya 38% (5/13) kambing betina daripada kumpulan S memberi respons secara superovulasi sejajar dengan perlakuan. Embrio telah dipindahkan ke dalam penerima, kebuntingan dipantau dengan menggunakan *ultrasound scanning* dan kelahiran anak kambing diperhatikan. Jumlah respons ovari (CL tambah folikel tanpa ovulasi) antara perlakuan adalah lebih tinggi secara signifikan ($P < 0.05$) dalam kumpulan suntikan berganda (kumpulan M₁ dan M₂) daripada kumpulan suntikan tunggal (kumpulan S). Walaupun tiada perbezaan signifikan ($P > 0.05$) antara kumpulan suntikan berganda bagi respons ovari, dos tinggi oFSH secara konsisten memberi peratus ovulasi dan CL bagi setiap kambing betina lebih tinggi ($72.4\% \pm 7.6$ vs. $58.8\% \pm 3.9$ dan $16.9\% \pm 3.9$ vs. $11.6\% \pm 1.0$, masing-masing) berbanding dengan dos rendah. Peratus folikel tanpa ovulasi adalah lebih tinggi secara signifikan ($P < 0.05$) dalam kumpulan S diikuti oleh kumpulan M₁ dan M₂. Kadar perolehan setiap ekor betina bagi struktur (embrio tambah oosit) adalah lebih tinggi secara signifikan ($P < 0.05$) dalam kumpulan M₂ diikuti M₁ dan S (5.4 ± 2.4 , 3.2 ± 1.2 dan 0.5 ± 0.5 , masing-masing). Walau bagaimanapun, tiada signifikan ($P > 0.05$) pada perolehan embrio berdaya hidup antara kumpulan suntikan berganda (M₁; 2.4 ± 1.0 , M₂; 2.0 ± 1.4 , masing-masing) dan kumpulan suntikan tunggal (S; 0.1 ± 0.1). Baka dan berat badan tiada memberi kesan signifikan ke atas respons ovari dan perolehan embrio. Walau bagaimanapun, hanya 2 ekor anak kambing kembar telah lahir mati hasil daripada pemindahan embrio. Adalah disimpulkan bahawa dos, baka dan berat badan tidak mempengaruhi pengeluaran embrio berdaya hidup bagi kambing

tempatan di Malaysia yang diperlakukan dengan protocol superovulasi suntikan berganda oFSH. Penggunaan suntikan berganda pada dos rendah oFSH memberi kelebihan ekonomi dan mudah bagi pengeluaran embrio berdaya hidup secara *in vivo*. Penyelidikan yang lebih terperinci diperlukan untuk mengoptimumkan amaun gonadotropin bagi superovulasi kambing kacukan tempatan.

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LIST OF PUBLICATIONS

A. Journal

1. Abdullah, R.B., Shariffah, N.Y., Rahman, M.R., & Wan Khadijah, W.F. (2012). Ovarian responses after superovulation with different dosages of oFSH in goats. *Malaysian Journal of Animal Science*, 15, 21-25.

B. Poster Presentation

1. Shariffah, N.Y., Abdullah, R.B., & Wan-Khadijah, W.E. (2009). Effect of gonadotrophin preparation for caprine superovulation on ovarion response. *In Proceedings of the 21st Veterinary Association Malaysia Congress*, (pp 190-193).Port Dickson, Malaysia.
2. Shariffah, N.Y., Abdullah, R.B., & Wan-Khadijah, W.E. (2009). Superovulatory response and embryo recovery in Malaysian goats. *In Proceedings of the International Conference on Animal Health & Human Safety*, (pp 183-185). Putrajaya, Malaysia.
3. Shariffah, N.Y., Abdullah, R.B., & Wan-Khadijah, W.E. (2010). The Effect of Different Doses and Patterns of Administration of Ovine FSH on Superovulation Response and Embryos Recovery in Malaysian Goats. *Reproductive Biotechnology*. Asian Reproductive Biotechnology Society, 7: 113
4. Abdullah R.B., Shariffah, N. Y., Rahman, M.R., & Wan Khadijah, W.E. (2011). Effect of oFSH dosages in superovulation protocol on ovarian responses in goat. *In proceeding of The 3rd International Conference on Sustainable Animal Agriculture for Developing Countries*, (pp 87-88). Nakhon Ratchasima, Thailand.

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LIST OF ABBREVIATIONS

AI	- artificial insemination
ANOVA	- Analysis of variance
ART(s)	- assisted reproductive technique(s) or technology(ies)
BSA	- Bovine Serum Albumin
CIDR	- Controlled Internal Drug Releasing Device
CL	- Corpus luteum
DMRT	- Duncan Multiple Range Test
DPBS	- Dulbecco Phosphate Buffered Saline
E2 -17 β	- Oestradiol-17 β
eCG	- Equine Chorionic Gonadotrophin
ET	- embryo transfer
FGA	- Flurogestone Acetate
FSH	- Follicle Stimulating Hormone
GnRH	- Gonadotrophin Releasing Hormone
HAP	- Horse Anterior Pituitary Extract
hCG	- Human Chorionic Gonadotrophin
ICSI	- intracytoplasmatic sperm injection
IGF-I	- Insulin-like Growth Factor I
i.m.	- intramuscular
IU	- International Units
LH	- Luteinizing Hormone
LHRH	- Luteinizing Hormone Releasing Hormone
MAP	- Medroxyprogesterone Acetate
MOET	- Multiple ovulation and embryo transfer
oFSH	- Ovine Follicle Stimulating Hormone
OR	- oocytes recovery/retrieval
PBS	- Phosphate-Buffered Saline

pFSH	- Porcine Follicle Stimulating Hormone
PGF _{2α}	- Prostaglandin F _{2α}
PMSG	- Pregnant Mare's Serum Gonadotrophin
RO	- reverse osmosis
SEM	- Standard Error of the Mean
s.c.	- subcutaneous
SPSS	- Statistical Package For Social Sciences