Oral imipramine and intravenous xylazine for pharmacologically-induced ejaculation in donkeys

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Abstract

The aim of this study is to evaluate using chemical method by oral imipramine and intravenous injection of xylazine for semen collection from donkeys in a field condition. Five mature male donkeys were used in this study weighting 120-150 Kg, aged 2-4 years, kept in the animal house of the Veterinary Collage, University of Mosul. Semen collections were performed by administration of a combination of imipramine hydrochloride 3 mg/kg. BW orally then 2 hours later, intravenous xylazine hydrochloride was injection as 1.1 mg/kg BW then semen was collected in ballistic tube. A total of 29 ejaculates from 30 trials were collected successful with a successful rate up to 96.6%. Semen characteristics of these donkeys were volume 60.1±2.9 ml, individual motility 53.5±2.0%, sperm concentration 60.2±1.7×10^6/ml sperm abnormalities 9.5±3.3%, live sperm 57.2±4.5% and PH 7.3±1.8. It could be concluded that, chemical method could be used successfully for semen collection from donkeys.

Keywords: Imipramine; Xylazine; Chemical ejaculation; Donkey; Semen.
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إعطاء الامبرامين عن طريق الفم مع الزيلازين عن طريق الوريد لإحداث القذف دوائيا في الحمير

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الخلاصة

اجريت الدراسة الحالية لغرض تقييم الطريقة الكميائية التي تضمنت اعطاء الامبرامين عن طريق الفم ثم حقن الزايلازين عن طريق الوريد لغرض جمع السائل المنوي في الحمير في ظروف الحقل، استخدم في الدراسة خمسة ذكور حمير بالغة تراوحت اوزانها مابين ١٢٠-١٥٠ كغم، وكانت اعمارها مابين ٢-٤ سنوات، وضعت الحيوانات في بيت الحيوان التابع لكلية الطب البيطري، جامعة الموصل. جمع السائل المنوي بعد اعطاء الامبرامين عن طريق الفم بجرعة ٣ ملغم/كغم من وزن الجسم ثم حقن الزايلازين عن طريق الوريد بجرعة ١,١ ملغ/ كغم من وزن الجسم، وبعد ٢ ساعة، جمع السائل المنوي في انبوب جمع بلاستيكي استخدم لهذا الغرض، جمعت ٢٩ قذفة منوية من مجموع ٣٠ محاولة بنسبة نجاح بلغت ٩٦,٦٪، صفات السائل المنوي للحمير التي تضمنتها الدراسة كانت ٦٠,١ ± ٢,٩ مل للحجم، ٥٣,٥ ± ٣,٣ ٪ معدل الحركة الفردية ، تركيز الحيامن بلغ ٦٠,٢ ± ١,٧ × $١٠^{٦}$، تشوهات الحيامن بلغت ٩,٥ ±٣,٣٪ ،نسبة الحيامن الميتة ٥٧,٢ ±٤,٥ ٪ ومعدل الدالة الحامضية ٧,٣ ± ١,٨. يستنتج من الدراسة الحالية انه بالامكان استخدام الطريقة الكميائية لغرض جمع السائل المنوي في الحمير.

Introduction

Donkeys are occupied in rural areas, generally use in working life and transportation due to its high disease resistance and cheap to purchase and to care (1).

Several methods were used in equine species including artificial vagina, condom, vaginal sponge and masturbation for semen collection from male donkeys or stallions (2,3). These methods have some disadvantages like kicking or jump of female leading to positive danger to animal or

person in both (4). Chemical ejaculation was used in equine species especially in stallion as a new method for semen collection (5,6). In general, chemical method for semen collection in stallion included the use of oral or intravenous imipramine alone, detomedine, xylazine alone, oral or intravenous imipramine with intravenous xylazine (7), prostaglandin PGF2α (8).

Xylazin, an alpha-adrengic agonist, is commonly used for sedation and analgesia in equines (9).

Subsequently, xylazine has been used clinically to induce ejaculation in stallion with neurologic or lameness problems that prevent normal copulation (5).

Imipramine, a tricyclic antidepressant inhibits re up-take of several neurotransmitters, including dopamine, neropinephrine, and serotonin (10). Tricyclic antidepressant have been used in human for treatment of aspermia (11), premature ejaculation (12) and retro grade ejaculation (13).

This is the first report of using chemical methods for semen collection from donkey. The purpose of present study was to use oral imipramine and intravenous xylazine for pharmacologically-induced semen and estimate donkey's semen characteristics after collection.

Material and methods

Five mature male donkeys aged between 2-4 years, weighting 120-150 Kg body weights were used in this study. These animals were housed in the animal house, Collage of Veterinary Medicine, University of Mosul. Animal were feed with hay and 1 kg/ animal barley and water.

This study was carried out from November 2010 to February 2011. Semen collection was performed weekly, with a pilot study for 1 month befor study begain to determined type of administration forms of imipramine which leading to best results.

After restricted of the donkey and setup of a non-spermicidal modified plastic tube, treatment considered of imipramine hydrochloride (Tofranil 25 mg. production of NOVATIS Ph. Comp. Turkey. Istanbul) as 3 mg/kg BW orally in some portion of mixed with barley. Followed 2 hours later, an intravenous injection of xylazine hydrochloride (Xylazine base. Interchemie. Gasternory, Holland) as 1.1 mg/kg BW.

Donkeys were observed directly until ejaculation for 5-10 minute after the ingection of xylazine until ejaculation occurs. Semen collecting tube was removed after 2-5 minute of ejaculation. The gel fraction was removed by using clean cotton and semen samples were studied for semen characteristics immediately after collection. Semen characteristics were studied in donkey include volume, color and PH, the light microscope was used to evaluate individual motility, percentage of live spermatozoa, percentage of sperm abnormalities and sperm concentration.

Statistical analysis: data were analyzed by using SPSS program (SPSS 2003, SPSS Inc.) to find mean and stander error for sperm characteristics value.

Results

The results of this study showed that semen collections trials by this method had a successful rate 96.6%. 30 trials of semen collection from 5 animals leading to 29 ejaculation samples of semen.

The treatment showed that imipramine must be given orally as a tablet form (not as a powder form) in a few sweet food for animal, and after 2 hours later, intravenous injection of xylazine as dose 1.1-1.0 mg/kg body weight (17), semen drooped from penis after 5-15 minute in 4 animals. Five ejaculations occur with 1 hour after xylazine injection. The negative results recorded when imipramine was give to animal as powder with food and ejaculation never has been occurring. Donkey semen characteristics after collection by using oral imipramine hydrochloride then followed by intravenous injection of xylazine hydrochloride show in table 1.

Table 1: donkey semen characteristics after collection by oral imipramine hydrochloride followed by intravenous injection of xylazine hydrochloride.

Semen characteristics	Mean ± S.E	Rang
Volume / ml	60.1±2.9	20-80
Individual motility %	53.5±2.0	30-70
Sperm concentration $\times 10^6$	(60.2±1.7) $\times 10^6$	29-101
Live sperm %	57.2±4.5	30-60
Sperm abnormalities %	9.5±0.3	9-11
PH	7.3±1.8	7.2-7.7

Discussion

The current findings in this study (Table 1) showed that chemical ejaculation using oral imipramine followed by intravenous xylazine was a successful method to collect semen with good characteristics, slightly similar to normal value of donkey semen which collecting by another methods (13,14). The mechanism of chemical ejaculation method is related to the action of imipramine and xylazin, imipramine as a tricyclic anti-depressant which may lead to relaxation and enhance contraction of the ampulla (6), while xylazine contract smooth muscles of accessory sex glands, these synergies of action of xylazine and imipramine lead finally to ejaculation (7).

In this study, semen characteristics of donkey had high volume (60.1±2.9) with low sperm concentration (60.2±1.7)

$\times 10^6$. This data defer when comparing these features in stallion semen collected by the same method (4,15,16), This may be due to high dose of xylazine used in this study, leading to contraction of sex glands with longer time resulting in more volume and low concentration.

Chemical ejaculation represent important practical considerations for semen collection also this method was easy to use, can be done with or with out estrus teaser jenny or any sexual prestimulation, also can be use in animals suffering from abnormal condition like lameness, fracture and other abnormal conditions (15), and give good semen characteristics. The disadvantages of this method were imipramine must be given to animal as orally tablet form, animal must check up until ejaculation occurs. Advantage and disadvantage recorded in this study agreed with another studies using oral imipramine and intravenous xylazine for chemical ejaculation (4,6,7).

Time of semen ejaculation after xylazin injection show that semen ejaculation defer from animal to another, the ejaculation of second animal occur between 1 hours while the other animals ejaculation occur between 5-10 minutes after xylazine hydrochloride injection, this may be due to individual variation between animals and level of arousal status of animal (16).

In conclusion, semen collection by using oral imipramine and intravenous xylazine was effective method to collect semen without causing positive danger to donkey or collectors occur due to kicking or jump female jenny or mare, in other hand, get semen with good quality and quantity used for artificial insemination and mule production.

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