POST-CERVICAL INSEMINATION CATHETER WITH MULTIPLE DEPOSITION ZONES

The invention relates to a catheter defined by a one-piece element formed by a flexible elongated tubular body fitted at one end with a rounded body provided with a hole forming an axial extension of the tubular body, such that the post cervical insemination catheter (1) is defined by a tubular body (2) having at least one hole (3) for releasing a dose of semen at the distal end (4) thereof and at least one hole (5) for releasing a dose of semen at an intermediate point or area (6) of the tubular body (2).
Description

OBJECT OF THE INVENTION

[0001] The following invention, as it is expressed in the title of the present specification, relates to a post-cervical insemination catheter with multiple deposition zones, by means of which it is allowed to deposit the semen at two or more different points inside the genital tract of the female to be inseminated.

[0002] The catheter object of the present invention is defined as a one-piece tubular body fitted at one end (distal) with a spherical-shaped body provided with, at least, a hole being an extension of the axial hole of the tubular body, the end of which is introduced into the reproductive apparatus of the animal to be inseminated.

[0003] The essential object of the catheter is the incorporation of some additional holes at, at least, one point or area of the tubular body of the catheter, allowing obtaining a semen deposition at different points of the genital tract, that is, at a different depth of the genital tract.

[0004] On the other hand, the diameter of the holes may vary depending on the ratio of the dose of semen that we wish to deposit at each depth level inside the genital tract of the female.

FIELD OF APPLICATION

[0005] In the present specification a post-cervical insemination catheter with multiple deposition zones is described, applicable for the artificial insemination of different animal species: ovine, equine or bovine, and being especially applicable for the porcine specie.

BACKGROUND OF THE INVENTION

[0006] As it is well known, the need for high concentrations of spermatozoons, forces the insemination centers to increase the prices of the doses of semen in order to make the ejaculates profitable.

[0007] The reduction of the number of spermatozoons implies a significant drop in fertility, since most of them do not survive on their ascent throughout the female reproductive apparatus.

[0008] However, as they come closer to the place of fertilization the survival rate is higher and, consequently, one way of reducing their number in the dose would be their deposition at a deeper level in the genital tract.

[0009] On the other hand, this fact constitutes the cornerstone to the transcervical and deep intrauterine insemination, the usefulness of which has been widely demonstrated in recent years. However, both techniques have certain limitations.

[0010] Thus, the transcervical insemination requires a much higher number of spermatozoons than the deep intrauterine (1000-1500 millions vs. 50-150 millions), while with the deep intrauterine unusually low prolificities and even suppression of pregnancy by unilateral fertilization have been observed.

DESCRIPTION OF THE INVENTION

[0011] In the present specification, with the object of solving the aforementioned drawbacks, a post-cervical insemination catheter with multiple deposition zones is described, which will allow optimizing the results of both known techniques from medium concentrations (400-700 millions) contributing to make as profitable as possible the doses of semen.

[0012] Thus, the post-cervical insemination catheter is defined by a tubular body having, at least, a hole for releasing the seminal deposition at the distal end thereof and, at least, a hole for releasing the seminal deposition at an intermediate point or area of the tubular body.

[0013] Likewise, the post-cervical insemination catheter may have, at least, a hole for releasing the seminal deposition, between the holes for releasing the seminal deposition, provided at the distal end thereof and at the intermediate area of the tubular body.

[0014] Thus, between the mentioned holes provided at the distal end thereof and in the intermediate area of the tubular body, the catheter may have a variable number of holes for releasing a dose of semen, such that said dose of semen is dispensed at a larger distance of the catheter and the probability of reaching the object of fertilization to be higher.

[0015] Therefore, the catheter being presented has as an object that the hole or holes for releasing the seminal deposition at the distal end thereof is/are located at a uterine horn and the hole or holes for releasing the seminal deposition provided at an intermediate point or area of the tubular body correspond to the uterus and/or cervix.

[0016] On the other hand, the size or number of the holes will be proportional to the percentage of the dose of semen to be deposited at each of said areas (uterine horn and/or uterus and/or cervix), the end and intermediate holes for releasing a dose of semen being able to have different diameters among themselves or else identical diameters, according to the amount of the dose of semen which one is interested on depositing by each one of said holes.

[0017] By way of example, in the area located at the uterine horn 20% of the dose of semen could be deposited and at the intermediate area of the uterus the remaining 80% of the same dose of semen could be deposited.

[0018] By means of this, we can achieve the object of the fertilization, because when depositing an amount at the uterine horn, the probabilities of success with respect to the standard technique increase, while when depositing an amount at the intermediate area of the uterus the unilateral fertilization is prevented.

[0019] Moreover, the catheter will be able to be introduced without guide catheter or with guide catheter.

[0020] The possible holes made between the holes of the distal end and the intermediate holes could be located...
at any area thereof.

[0021] In order to complement the description that will be made in the following, and with the object of helping to a better understanding of the characteristics of the invention, the present specification is accompanied by a set of planes, on each of which figures in an illustrative but not limiting way, the most characteristic details of the invention are plotted.

BRIEF DESCRIPTION OF THE DESIGNS

[0022]

Figure 1. Shows an elevational view of a post-cervical insemination catheter with multiple deposition areas, being able to observe how the deposition of the dose of semen will take place by the distal end thereof and by, at least, one intermediate area.

Figure 2. Shows a view of the way of introduction of a post-cervical insemination catheter with a seminal deposition at one uterine horn and another area of seminal deposition in the uterus.

DESCRIPTION OF A PREFERRED EMBODIMENT

[0023] In view of the mentioned figures and according to the adopted numbering it can be observed how the post-cervical insemination catheter 1 for multiple deposition is defined as a one-piece element formed by a flexible elongated tubular body 2, fitted at one end (the internal end in the insemination) with a rounded body provided with, at least, a hole forming an axial extension of the tubular body.

[0024] The catheter being presented has the object of locating the hole or holes 3 for releasing the seminal deposition at the distal end thereof 4 at a uterine horn 7 and locating the hole or holes 5 for releasing the seminal deposition at an intermediate point or area 6 of the tubular body 2 in the uterus 8.

[0025] Between the areas of the holes 3 and 5 for releasing a dose of semen, it may have other holes 9 allowing the deposition of the dose of semen at areas among the cervix, the uterus and the uterine horn.

[0026] On the other hand, the size and number of the holes 3 and 5 will be proportional to the percentage of the dose of semen to be deposited at each one of said areas 4 and 6.

[0027] By way of example, in the area 4 located in the uterine horn 7 an amount that could be 20% of the dose of semen will be deposited and in the intermediate area 6 of the uterus the remainder of the dose of semen will be deposited, in the noted case 80%, these percentages being able to, logically, vary, according to the requirements of insemination and to the number of holes made on the catheter.

[0028] Since a smaller percentage deposited in the uterine horn is more efficient than a higher percentage at another part of the genital tract of the female to be inseminated, the probabilities of success of the insemination carried out by means of the catheter object of the invention significantly increase.

[0029] Given the constitution of the catheter 1 it will be able to be introduced without guide catheter or with guide catheter.

[0030] In short, the essential object of the catheter 1 is having one or more additional holes in the tubular body at a variable distance from the mentioned distal hole.

[0031] The diameter of the holes made on the catheter could all of them be identical, different, or else could be some of them identical among themselves and others different, in order to adapt according to the volume of semen wanting to deposit at the different locations along the genital tract.

[0032] Thus, the main novelty of the new catheter with respect to those already available in the market is that it offers the possibility of carrying out post-cervical insemination at two or more depth levels in the female reproductive apparatus.

[0033] Therefore, while the distal hole or holes will allow depositing a specific volume of semen in the body of the uterus and/or cervix, in the utero-tubal junction or inside the uterine horn, the remaining holes will allow depositing a variable volume of semen at cervical or post-cervical level.

[0034] The new insemination system shows the same advantages as the post-cervical insemination systems, with regard to the place of deposition, the reduction in the incidence of reflux during the insemination and reproductive results, but shows additional advantages with regard to the rest of intrauterine systems.

[0035] The new catheter will considerably reduce the number of spermatozoons used and, as a result, the costs of the insemination process with the resulting economic benefit. This reduction on the number of spermatozoons used is due to two basic facts derived from the existence of two or more semen deposition points:

1) The lateral holes will allow reducing loss of spermatozoons by reflux by guaranteeing the insemination beyond the cervix.
2) By being a deep intrauterine insemination, the deposition of semen through the distal hole of the catheter would minimize besides the reflux, the attack effect by the polymorphonuclear leukocytes (responsible for the death of 80% of the spermatic dose), consequently allowing a considerably higher reduction in the dose.

[0036] Another of the advantages derived from the existence of two or more areas for the dispersion of semen is the possible increment of prolificity with regard to the current deep intrauterine insemination systems.

[0037] As it has been observed in several occasions, the deep intrauterine insemination reduces the prolificity as a consequence of the solely fertilization of the oocytes located in the uterine horn wherein the catheter is
The new catheter object of the invention prevents this problem since by allowing depositing a part of the dose of semen at a portion of the reproductive tract preceding the uterine horn simultaneously to the deep intrauterine insemination, with the post-cervical insemination we increase the possibility of fertilization in the uterine tube through which the catheter is introduced, while the spermatozoons deposited at the portion of the reproductive tract preceding the uterine body, will be able to ascend until reaching the oviduct where the fertilization by both uterine horns occurs.

**Claims**

1. **POST-CERVICAL INSEMINATION CATHETER WITH MULTIPLE DEPOSITION ZONES,** being the type of catheter defined by a one-piece element formed by a flexible elongated tubular body, fitted at one end with a rounded body provided with a hole forming an axial extension of the tubular body, characterized in that the post cervical insemination catheter (1) is defined by a tubular body (2) having, at least, one hole (3) for releasing a dose of semen at the distal end (4) thereof and, at least, one hole (5) for releasing a dose of semen at an intermediate point or area (6) of the tubular body (2).

2. **POST-CERVICAL INSEMINATION CATHETER WITH MULTIPLE DEPOSITION ZONES,** according to claim 1, characterized in that the post-cervical insemination catheter (1), has, at least, one hole (9) for releasing the dose of semen between the distal (3) and intermediate (5) holes for releasing a dose of semen.

3. **POST-CERVICAL INSEMINATION CATHETER WITH MULTIPLE DEPOSITION ZONES,** according to claim 1, characterized in that between the distal (3) and intermediate (5) holes for releasing the dose of semen it has a variable number of holes (9) for releasing the dose of semen, these being able to be located at any area of the tubular area of the catheter.

4. **POST-CERVICAL INSEMINATION CATHETER WITH MULTIPLE DEPOSITION ZONES,** according to claims 1, 2 and 3, characterized in that the distal (3) and intermediate (5) holes for releasing the dose of semen have the same diameter.

5. **POST-CERVICAL INSEMINATION CATHETER WITH MULTIPLE DEPOSITION ZONES,** according to claims 1, 2 and 3, characterized in that the distal (3) and intermediate (5) holes for releasing the dose of semen have a different diameter.

6. **POST-CERVICAL INSEMINATION CATHETER WITH MULTIPLE DEPOSITION ZONES,** according to claims 1 and 3, characterized in that the holes (9) made between the distal holes (3) and the intermediate holes (9) could have any diameter.

7. **POST-CERVICAL INSEMINATION CATHETER WITH MULTIPLE DEPOSITION ZONES,** according to claims 1 and 2, characterized in that the hole (3) for releasing the dose of semen at the distal end (4) thereof is located at a uterine horn (7) and the hole (5) for releasing the dose of semen at an intermediate point or area (6) of the tubular body (2) corresponds to the uterus (8).

8. **POST-CERVICAL INSEMINATION CATHETER WITH MULTIPLE DEPOSITION ZONES,** according to claims 1 and 2, characterized in that the size and number of the holes (3), (5) and (9) will be proportional to the percentage of the semen deposition to be carried out at each of the zones relative thereto.

9. **POST-CERVICAL INSEMINATION CATHETER WITH MULTIPLE DEPOSITION ZONES,** according to the preceding claims, characterized in that the amount of the dose of semen to be deposited at each zone will correspond to the number and size of the holes (3), (5) and (9), made on each one of them.

10. **POST-CERVICAL INSEMINATION CATHETER WITH MULTIPLE DEPOSITION ZONES,** according to claim 1, characterized in that the catheter (1) is introduced without guide catheter.

11. **POST-CERVICAL INSEMINATION CATHETER WITH MULTIPLE DEPOSITION ZONES,** according to claim 1, characterized in that the catheter (1) is introduced with guide catheter.
INTERNATIONAL SEARCH REPORT

International application No. PCT/ES 2008/000510

A. CLASSIFICATION OF SUBJECT MATTER

A61D 19/02 (2006.01)
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A61D 19/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

INVENES, EPDOC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<td>FR 2574656 A1 (CASSOU ROBERT) 20.06.1986, abstract; figure 2.</td>
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☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance.

"E" earlier document but published on or before the international filing date

"I" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure use, exhibition, or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search: 10 November 2008 (10.11.2008)

Date of mailing of the international search report: 10-12-2008

Name and mailing address of the ISA/ O.E.P.M.:
Paseo de la Castellana, 75 28071 Madrid, España.
Facsimile No. 34 91 3495304

Form PCT/ISA/210 (second sheet) (July 2008)

Authorized officer E. Álvarez Valdés
Telephone No. +34 91 3498419
**INTERNATIONAL SEARCH REPORT**

**International application No.**

**PCT/ES 2008/000510**

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<td>Contrary to PCT Article 6, these claims do not clearly define the subject matter for which protection is sought. The features used to define the catheter are unclear and therefore it is not possible to examine these claims in respect of novelty and inventive step</td>
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<td>3. ☐ Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).</td>
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1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

**Remark on Protest**

- ☐ The additional search fees were accompanied by the applicant’s protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant’s protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet (2)) (April 2005)
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