COMPARISON OF ENDOSCOPIC, ULTRASOUND AND MICROBIOLOGICAL EXAMINATIONS IN DIAGNOSIS OF REPRODUCTIVE DISORDERS IN MARES

Endoscopyc examinations were performed on 37 mares of different breeds. All examined mares had reproductive problems. During the examination, the following pathological changes were found: inflammation of endometrium in 19 cases (64.9%), uterus adhesions in 4 cases (10.8%), exudate in uterus lumen in 13 cases (32.4%), thin fibrin exudate in 8 cases (21.6%) and lymphatic cysts in 12 cases (32.4%). In one case adhesions in the cervical wall were found, and in one case there was hair encapsulated in the cervical mucus as a consequence of fetotomy. These changes were found in 2.7% of cases.

Key words: bacteriology, endoscopy, infertility, mare, ultrasound

Introduction / Uvod

Endoscopy of the uterus is one of the diagnostic methods used for diagnosis of fertility disorders in mares. Different terms for the method mentioned above can be found in literature: endoscopy [3], hysteroscopy [6, 7, 5], fibroscopy [4] and videoendoscopy [21]. Modern endoscopic equipment enables a precise examination of the uterus from its cervix to the uterine horns. The picture of the uterus cavity can be observed directly, it can be photographed or transferred to the screen by camera [2, 1] i.e. videoendoscopy. Following dilatation using physiological solution or gas (CO₂), changes in the endometrium can be identified such as endometrial cysts, adhesions, accumulated fluid, abscesses, neoplasia, scars (cicatrices), foreign bodies, changes in the colour of mucus (anemia,
hyperemia), mild inflammatory changes, which cannot be identified by other diagnostic methods. The modern endoscopes permit site specific biopsy, aspiration of uterine content, curettage for bacteriological, cytological or histological examination and small surgical procedures [5, 9].

An endoscope can also be used for the treatment of the uterus (flushing of the uterus or application of drugs), as well as for surgical procedures on the endometry such as removal of lymphatic cysts and neoplasms [8]. An endoscope can also be successfully used in the examination of the development of the fetus and placental membranes, as well as in early twin pregnancies of mares when we want to eliminate one embryo.

**Materials and methods / Materijal i metode rada**

The following endoscopic equipment was used for the endoscopic examination of the uterus:
- Fibroscope (colonoscope) Olympus, type 301/I/M,
- Insufflation unit Olympus, type A 4075-78,
- Light source Olympus, type CLK-4,
- Instruments Olympus, type FG-25 SX,
- Videocamera Storz, type 20211001.

In the present study 78 endoscopic examinations were performed. Out of 37 mares of different breeds and ages, 9 mares had reproductive problems, 16 mares did not remain pregnant during the season, and 12 mares were infertile for one year or more.

An endoscopic examination was performed in all mares beside the gynaecological examination (vaginal and rectal ultrasonographic examination) and next to diagnostic examinations (bacteriological, cytological). Before the examination mares should be restrained in stocks, the tail should be wrapped and the perineal area washed and disinfected.

**Results and discussion / Resultati i diskusija**

In 8 mares (32%) the secretion from the uterus was determined by vaginal examination. In 18 mares (48.6%) accumulation of fluid in the uterus and in 12 mares (32.4%) endometrial cysts were determined by ultrasound examination. Out of 22 mares (59.6%), whose vaginal culture was found to be bacteriological positive, in 13 cases hemolytic *Streptococcus* spp., in 7 cases *Taylorella equigenitalis*, and in two cases *Staphilococcus aureus* and *Yersinia entercollica*, respectively, were isolated.

By the use of endoscopy, in all 37 examined mares one or more pathological changes in the uterus were determined. Uterine adhesion was identified in
4 (10.8%) of the examined mares. Colour changes of the endometrium were observed in 25 mares (67.6%) in 21 mares (64.9%) hyperemia as a consequence of inflammation was determined, and in 2 mares (5.4%) anemia in some parts of the endometrium was identified, resulting from previous injuries. In 13 mares (35.1%) an increased fluid accumulation with inflammatory products in the uterus was found. Lymphatic cysts were identified in 12 mares (32.4%). In 8 cases (21.6%), that had retained fetal membranes, thin fibrin exudate was found using endoscopic examination. In one case adhesions in the cervical wall were found, and in one case there was hair encapsulated in the cervical mucus as an outcome of feto-tomy. These changes were identified in 2.7% of examined mares.

Table 1. Comparison of endoscopic, ultrasound and bacteriological results

<table>
<thead>
<tr>
<th>Changes in the uterus / Promene na uterusu</th>
<th>Endoscopy / Endokopske</th>
<th>Ultrasound / Ultrazvuko</th>
<th>Bacteriology / Bakteriološko</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperamia / Hiperemija</td>
<td>21</td>
<td>18</td>
<td>10</td>
</tr>
<tr>
<td>Anemia / Anemija</td>
<td>2</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Adhesions / Adhezija</td>
<td>4</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Accumulated fluid or exudate / Akumulirana tečnost ili eksudat</td>
<td>13</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>Endometrial cysts / Endometrijalne ciste</td>
<td>12</td>
<td>12</td>
<td>–</td>
</tr>
<tr>
<td>Fibrin / Fibrin</td>
<td>8</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Hair in the cervix / Dlaka u cerviku</td>
<td>1</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

In addition to being a diagnostic tool, endoscopy can also be used for therapy of the uterus such as removing contents from the uterus, flushing of the uterus and application of drugs into the uterus. Endoscopic minor surgical interventions in the uterus (removal of cysts) can also be performed.

Due to poor prognosis based on the results of uterus examination using endoscopy in 7 mares infertility therapy was not performed; in 4 mares highly developed uterine adhesions were identified, in 2 mares cicatrices after damaged endometrium, and in 1 mare a great number of endometrial cysts was found. The remaining 30 mares were treated. In 10 mares the majority of endometrial cysts were surgically removed using endoscopic technique, and in 13 mares endometritis was treated. According to the data obtained so far, 18 mares became pregnant after treatment, 7 mares obviously did not remain pregnant, and for remaining 12 mares the results are not known yet.
Although the number of examinations by the use of endoscopy in the period of two years was not high, the changes established in our cases are similar to the results of other authors [7, 5, 4].

From the results of our examinations it can be concluded that the causes of infertility, unable to be determined by other methods, were diagnosed using endoscopy in 15 (40.5%) of the examined mares. A proper diagnosis using endoscopy as well as a more objective prognosis was achieved in 19 (51.4%) of the examined mares.

**Zaklučak / Conclusion**

The endoscopic examination of the uterus was helpful in determining the cause of infertility in mares. It proved to be the most reliable method in comparison to ultrasound and microbiological examinations. Despite the findings mentioned above, we could conclude that practitioners should use all available tests and techniques and should not rely on only one. From our experience the endoscope proved to be a very useful instrument also for treatment and small surgical procedures i.e. flushing, removal of endometrial cysts, application of drugs, etc.

**Literatura / References**

Primenom videoendoskopije pregledali smo 37 kobila različitih pasmina in uzrasta. Sve pregledane kobile su imale poremećaje u plodnosti. Prilikom pregleda utvrdili smo patološke promene kao što su: upala sluznice materice u 19 slučajeva ili u 64,9%, adhezija materice u 4 slučaja ili u 10,8%, tečnost sa ugružcima gnoja u šupljini materice u 13 slučajeva ili u 35,1%, tanke fibrinske naslage u 8 slučaja ili u 21,6% i limfatične ciste u 12 slučajeva ili u 32,4% pregledanih kobila. U jednom slučaju utvrdili smo adhezije u zidu cerviksa, a u jednom slučaju dlake prirasle na sluznicu cerviksa, što je bila posledica fetotomije obavljene pre. Te promene su bile utvrđene u 2,7% pregledanih životinja.

Ključne reči: kobile, neplodnost, dijagnostika, mikrobiologija, endoskopija, ultrazvuk