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COMPARISON OF DIFFERENT SUTURE MATERIALS FOR CLOSING WOUNDS IN OVARIOHYSTERECTOMY

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Abstract. *In the stitching midline laparotomy incision, it is necessary to ensure reliable support of their edges and walls until complete splicing and minimal disruption of microcirculation in the area of the suture stitches. It is caused by the presence of intra-abdominal pressure, abdominal muscle tone, poor blood supply of muscular aponeurosis, respectively, their longer regeneration. Currently, the so-called "cosmetic" sutures are often used to close aseptic incisions of abdominal cavity. The advantage of such sutures is the excellent appearance due to the more precise co-optation of the epidermal and dermal layers of the skin. However, such sutures are not always suitable for closing the surgical wounds of the abdominal wall in small animals, in particular because of the features of knots tying. The article presents the results of studies on the effectiveness of the use of various suture materials in performing ovariohysterectomy in cats. It was found that after ovariohysterectomy in cats for all research group's wounds of the abdominal wall healed by primary intention. In the observation of operated cats the occurrence of postoperative hernias were not found. But it should be noted that at the closure of the surgical wound in cats of the first group, which was placed simple knot suture to the peritoneum with muscles and intracutaneous suture on the skin using Vicryl formed thinner elastic scars, which differed slightly on the skin surface. At palpation on the 7th day they were determined in the form of elastic consistency rollers with a thickness of 3.2-4.9 mm, on the 14th day - 2.0-3.4 mm with a gradual softening and reduction of thickness, which was much smaller than in cats of the second and third groups.*

Keywords: *laparotomy wound, ovaiohysterectomy, suture materials*

Relevance. Methods of tissue joining, as well as the qualitative characteristics of the suture material used for this, have a significant impact on the results of surgery, the course of the postoperative period and the presence of postoperative complications (Egiev V.N., 1998).

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Currently, in veterinary surgery, wide variety of suture materials are used, non-absorbable and absorbable, those that are able to bioresorbe (dissolve) in the animal body. The first of them are encapsulated and almost permanently stored in the tissues, and sometimes they can become a source of chronic aseptic inflammation, and in some cases - purulent processes in the operated area (Kuzin M.I., Kostyuchenok B.M., 1990; Struchkov V.I., Belyakov V.D., 1998).

The main positive advantage of bioresorbable surgical filaments is that in the process of tissue healing, these filaments are dissolved and cannot become a source of suppuration (Mohov E.M., 2008; Phakadze G.A., 1990).

In view of the above, it is relevant to study the effect of various types of suture materials used in closing laparotomy incisions in ovariohysterectomy on the course of healing processes. The obtained data will allow to reduce the time of recovery for animals and minimize the number of postoperative complications cases caused by the suture materials.

Analysis of recent researches and publications. The main method of tissues connection in surgery is suture placing with threads, and the properties of the suture material used for this purpose, cannot fail to affect the nature of morphological processes in the area of connected tissue structures (Mohov E.M., 2008; Struchkov V.I., Belyakov V.D., 1998).

Suture materials have been used in surgery since ancient times. Tissues were connected using silk threads, hemp threads, rats and cats tendons, whale whiskers, horse hair, filaments from the small intestine of sheep (catgut), from aorta, bovine brain dura mater, etc. Today, synthetic threads have almost completely replaced the suture material of former times (Egiev V.N., 1998).

All modern sutures by chemical nature can be classified into: cellulose-based filaments (cotton, linen); based on animal protein (catgut, silk); polyamide filaments (capron, Nylon); polyester filaments (lavsan, Ethiflex, Surgidac); polypropylene filaments (polypropylene, Prolen); fluoropolymer filaments (Pronova, Marilon); polyglycolic acid derivatives (Dexon, Vicryl, Polisorb); polydioxane filaments (PDS II); caprolactone filaments (Caprolon); inorganic filaments (metal wire (steel, nichrome, platinum) (Egiev V.N., 1998; Phakadze G.A., 1990).

Another one important criterion of modern suture material is biodegradation (absorption capacity). Based on this criterion, all modern surgical threads can be divided into three groups: absorbable materials - Catgut, PGA, Monocryl, Vicryl, Maxon, and others; materials that are conditionally absorbable - silk and polyamide thread; non-absorbable - polyester (Lavsan, Mersilen, Surgidac), polypropylene (Prolen, polypropylene), metal wire, etc. (Phakadze G.A., 1990)

For a long term, due to the identification of certain shortcomings, some suture materials have changed to others, more modern and more and perfect. Despite the considerable results achieved in the creation of surgical threads, the question of their impact on the tissues, the intensity of wound healing, the quality of the scar formed, and the frequency of complications is still open. (Struchkov V.I., Belyakov V.D., 1998; Kuzin M.I., Kostyuchenok B.M., 1990).

In view of the foregoing, the aim of this study was to investigate in a comparative aspect different surgical threads for closure of laparotomy wounds in ovariohysterectomy in cats.

Materials and methods of research. The studies were performed at the Department of Surgery and Pathophysiology named by academician I. O. Pozhenzhenko of NULES of Ukraine and one of the private clinics in Kyiv. The main object of the study were clinically healthy cats (females) aged from 7 months to 5 years, in the number of 18 animals without visible pathologies with a body weight of 2.5-5 kg, selected by the type of analogues. Animals were divided into 3 experimental groups, each containing 6 cats. Main part of cats used in the experiment belonged to private owners. In cats, laparotomy was performed, followed by surgery on the organs of the reproductive system – ovariohysterectomy. Before the operative interference, animals were kept on 10-12 hours period of fasting. Operations were performed under general anesthesia, following the rules of aseptics and antiseptics. In cats used a drug "Zoletil 100" at a dosage of 10 mg/kg animal weight. For premedication, atropine sulfate was used at a dose of 0.05 mg/kg subcutaneously 15 minutes before the administration of Zoletil. Access to organs of the reproductive system in cats was performed through the median incision of the abdominal wall, after performing ovariohysterectomy laparotomy wound in cats was closed with the following combinations of surgical sutures:

In the first research group in cats, for closing the outer wound and for the internal sutures and ligatures used Vicryl 3-0, in the second group for ligature and internal sutures used a modern synthetic absorbable pseudomonofilament (monofilament coated thread) thread PGA 3-0, for external sutures capron, in the third - PGA for the innternal suture, for the external – synthetic multifilament thread Maxon. In the second group, surgical site was closed by continuous suture (peritoneum, muscles) + simple interrupted pattern (skin), in the first and third groups – simple interrupted pattern (peritoneum, muscles) + intradermal suture (skin). The sutures in the postoperative period were protected from licking a wound by the animal protective collar for 10 days. Sutures were cleaned for 8 days with an alcohol

3% solution of boric acid 2 times a day. Clinical examination of the animals was performed one day before surgery and the day of the planned operation. Then, daily, during all postoperative period, the main vital signs (temperature, pulse rate, respiratory rate), local signs of inflammation in the area of the sutures and the degree of wound healing were determined.

Results of the study and their discussion. After clinical trials, in queens that underwent ovariohysterectomy and after obtaining the results, it was found that physiological parameters, such as the body temperature, pulse rate and respiration rate beyond its normal range during the all postoperative period. In the first group of cats from the first day of the postoperative period, a good cooptation of the edges and walls of the wound was observed. During the entire postoperative period, the scar and surrounding tissues were clean and dry. There were no instances of dehiscence detected by visual examination for any queen in this group.

In the first seven days of the postoperative period, in the area of intradermal suture, inflammatory edema was not very strong, which indicated a favorable postoperative period. At palpation in the area of the suture scar a was 3.2-4.9 mm wide. The skin adjacent to the scar are mobile and elastic. By the 14th day a complete epithelialized scar was formed. In the zone of an internal suture placement (aponeurosis of oblique abdominal muscles) the scar was more dense. On the skin with subcutaneous tissue (second row of suture) – almost invisible, movable in the form of a thin elastic roller with a moderately dense texture and 2.0-3.4 mm of thickness.

In the second group, suture was placed with the use of PGA for the suture (continuous) and Capron for the simple interrupted pattern that was applied to the skin. We observed a good cooptation of the edges and walls of the skin incision. Signs of wound dehiscence were not found. Adjacent to the scar areas of the skin were moderately mobile. During the first days, postoperative edema and tissue tension in the suture area were well expressed, and the stitches were moderately immersed in the surrounding tissue. On the 7th day the surface of the scar was dry, on the surface there was a small amount of dried scab in the form of crusts. In the process of formation of scar, was observed that dense scar 8.0-10.0 mm wide. After suture material removal, suppuration and tunneling from sutures was not detected, subsequently they quickly closed.

On day 14, after examination we noted that the postoperative scar is large, with palpation its width is approximately 6.0-8.0 mm, darker in color than the surrounding skin. In most cases, the wound scars had a transverse striation in

the reintroduction of the former suture stitches (Fig. 3.6).

In the third group for closing postoperative incision of the abdominal wall double row combination of simple interrupted pattern and intradermal sutures used with PGA and Maxon suture materials, respectively.

In the early and distant postoperative period, the surface of the scar and the surrounding areas were dry and clean with a small number of crusts in the first 5-7 days. Inflammatory edema in the area of the sutures placement is expressed moderately. On the 7th day, in the formation process apperence of scar up to 5.7-6.8 mm wide was observed. Signs of wound dehiscence were not found. On the 14th day, the postoperative scar looked like a thin line. By palpation we noted the presence of a dense elastic roller width of 4.8-5.7 mm.

Conclusions and perspectives. Thereby, after ovariohysterectomy in cats for all research group's wounds of the abdominal wall healed by primary intention. In the observation of operated cats the occurrence of postoperative complications associated with sutures was not detected. But it should be noted that at the closure of laparotomy access in cats of the first group, formed thinner elastic scars, which differed slightly on the skin surface. At palpation on the 7th day they were determined in the form of elastic consistency rollers with a thickness of 3.2-4.9 mm, on the 14th day – 2.0-3.4 mm with a gradual softening and reduction of thickness, which was much smaller than in cats of the second and third groups, indicates that the use of Vicryl have minimal impact on the biological tissues.

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ПОРІВНЯННЯ РІЗНИХ ШОВНИХ МАТЕРІАЛІВ ДЛЯ ЗАКРИТТЯ РАН ПРИ ОВАРІОГІСТЕРЕКТОМІЇ

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Анотація. *При ушиванні медіанних лапаротомних ран необхідно забезпечити надійну підтримку їх країв і стінок до повного зрощення і мінімальне порушення мікроциркуляції в зоні стібків шва. Це обумовлено*

наявністю внутрішньочеревного тиску, напругою м'язів черевного преса, слабким кровопостачанням м'язових апоневрозів, відповідно, більш тривалою їх регенерацією.

Нині для зашивання асептичних ран черевної порожнини нерідко використовують так звані «косметичні» шви. Перевагою таких швів є чудовий зовнішній вигляд за рахунок більш точної кооптації епідермального і дермального шарів шкіри. Проте такі шви не завжди підходять для закриття операційних ран черевної стінки у дрібних тварин, зокрема через особливості закріплення вузлів,.

У статті наведено результати досліджень з вивчення ефективності застосування різних шовних матеріалів при проведенні оваріогістеректомії у кішок. Було встановлено, що загоєння ран черевної стінки після оваріогістеректомії у кішок усіх дослідних груп проходило за типом первинного натягу. При спостереженні за оперованими кішками виникнення післяопераційних гриж виявлено не було. Але варто зазначити, що при закритті операційної рани у кішок першої групи, яким накладали вузловий шов на очеревину і м'язи та внутрішньошкірний шов на шкіру з використанням шовного матеріалу Vicryl формувалися більш тонкі еластичні рубці, які незначно вирізнялись на поверхні шкіри. При пальпації на 7 добу вони визначалися у вигляді валиків пружної консистенції товщиною 3,2-4,9 мм, на 14 добу - 2,0-3,4 мм з поступовим розм'якшенням і зменшенням товщини, яка була значно меншою, ніж у кішок другої і третьої груп.

Ключові слова: *лапаротомна рана, оваріогістеректомія, шовні матеріали*