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EVALUATION OF COATED POLYGLYCOLIC ACID SUTURES (DEXON PLUS) FOR URINARY BLADDER CLOSURE

(With 6 Fig.)

By

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تقييم خيوط الديكسون المغلف
في خياطة المثانة

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لقد أجري البحث علي عدد ٢٠ كلبا لمقارنة خيوط الديكسون المغلف بخيوط الكات جت لخياطة المثانة . وقد أظهرت النتائج أن خيوط الديكسون المغلف ليس لها تأثير قاطع علي جدار المثانة والذي كان العيب الواضح للخيوط الغير مغلفة برغم عدم استخدام الكستيرة التي تساعد علي عدم زيادة ضغط البول بالمثانة بعد العمليات . هذا وقد كان رد فعل الأنسجة أخف اذا ما قورن برد الفعل تجاه خيوط الكات جت . لذلك يمكن استخلاص أن تغليف خيوط الديكسون يمكن أن يحسن الخواص الإكلينيكية للخيوط بدون زيادة رد فعل الأنسجة لها .

SUMMARY

A number of twenty dogs were used to evaluate clinically and histopathologically the coated polyglycolic acid (Dexon plus) in comparison to catgut as suture materials for the urinary bladder closure.

The study revealed that the tissue drag and cutting which were serious drawbacks for the non coated polyglycolic acid did not occur when the coated material was used. The tissue reaction was mild towards coated polyglycolic acid in comparison to catgut which stimulated a chronic type of reaction. This may confirm that the coat improves the clinical characters of the suture material without inducing a pronounced tissue reaction.

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INTRODUCTION

While catgut was used for urinary bladder closure, in different suture patterns (GRAVES and GRAVES, 1979 and RAINS and MANN, 1988), polyglycolic acid (Dexon) was described as the absorbable suture material of choice in all urinary tract surgery (WINGFIELD and RAWLINGS, 1979 and GLENN, 1983). Tissue reaction is much milder twards polyglycolic acid in comparison to catgut (ECHEVERRIA and JIMENZ, 1970; BORTHWICK, 1973; EDLICH, et al. 1973; URDAHL, 1975 and WINGFIELD and RAWLING, 1979). In infected wounds, although polyglycolic acid induced intense acute reaction, the response was mild in chronic implantation (VARMA, et al. 1981). The infection rate of contaminated tissues containing polyglycolic acid was significantly lower than the incidence of infection of tissues containing catgut sutures (EDLICH, et al. 1973).

Tissue drag and cutting were serious drawbacks for polyglycolic acid sutures (BORTHWICK, 1973). Therefore, this study was designed to evaluate, clinically and histopathologically, the coated polyglycolic acid sutures for urinary bladder closure in comparison to catgut.

MATERIAL and METHODS

The study was conducted on twenty apparently healthy mongrel dogs of both sexes. The animals were 2 to 4 years old and 10 to 18 kg body weight. They were divided into four groups; each of 5 animals.

The animals were fasted for 12 hours before the operation. Surgery was performed under effect of thiopental intravenous anaesthesia after premedication by Combelen (Bayer).

Prepubic median laparotomy was done after the aseptic preparations. In males, the skin incision was done lateral to the penis, then the latter was deviated laterally to complete laparotomy in the midline. The urinary bladder was exteriorized, and the abdominal cavity was covered by a sterile towel. Urine was allowed to drain off by gentle pressure on the bladder. It was carefully rolled backwards and held at the apex by a stay suture. A-4 cm-long cystotomy incision was made in the dorsal aspect of the bladder wall away from the ureters.

Group 1: The cystotomy incision was closed using 6/0 coated polyglycolic acid sutures (Dexon Plus, Braided polyglycolic acid sutures coated with Poloxamer 188, Davis & Geck). Inverting Connel pattern was used as one raw suture.

Group 2: Urinary bladder closure was performed with 6/0 coated polyglycolic acid sutures, using two raws of inverting Cushing suture pattern.

Group 3: Urinary bladder closure was performed with 6/0 catgut using one raw of connel suture.

Group 4: The cystotomy incision was closed with 6/0 catgut using two raws of Cushing sutures.

The abdominal wall was closed as usual. The clinical findings were recorded. The animals were euthanized 21 days postoperatively. The macromorphologic results were evaluated. The specimens were takin for the histopathologic study, fixed in 10% buffered formaline and stained with haematxylin and eosine.

RESULTS

No intraoperative difficulties were encountered while using either catgut or coated polyglycolic acid sutures for closure of the urinary bladder. Tissue drag did not occur in any case. No postoperative complications were recorded.

After euthanasia of the animals, the macromorphologic examination revealed a slight adhesion between one end of th suture line and the omentum in one case sutured by polyglycolic acid using Connel suture pattern, Fig. 1. Marked adhesions between the bladder apex and omentum in 2 cases sutured by polyglycolic acid and 2 cases sutured by catgut, Fig. 2. Submucosal haemorrhages were recorded in 4 cases; 2 sutured by catgut and 2 by coated polyglycolic acid, Fig. 3. These 4 cases were closed using Cushing suture pattern. The suture materials did not appear either from the serosal or from the mucosal surfaces while using either Connel or Cushing Suture pattern.

Micromorphologically, the extravasations were subepithelially located in 4 cases sutured using Cushing suture pattern. Mild inflammatory cell infilterations were also seen, Fig. 4. Regarding the inflammatory process, it was destinct that using catgut induced more reaction than the polyglycolic acid suture. In the latter, few neutrophils could be seen, while catgut stimulated a chronic type of reaction rich in lymphocytic aggregations, Fig. 5. In the cases sutured using Connel suture pattern, epithelial deminage at the site of suturing was prominent, although regeneration by flattened epithelial cells was noticed. Peripheral hyperplastic changes at the edges could be seen, Fig. 6.

DISCUSSION

Clinically both coated plyglycolic acid and catgut proved to be effective suture materials for the urinary bladder closure in dogs. Inspite of no drainage catheters

were used to keep the intravesical tension at a minimum (GRAVES and GRAVES, 1979; GLENN, 1983 and RAINS and MANN, 1988), no tissue drage did occur. The adhesions which were found in some cases may be related to the site of the stay suture or the knot at the last stitch that might be not well inverted.

Although both one raw Connel and double raws Cushing suture patterns appeared to be effective for urinary bladder closure, some subepithelial haemorrhages were encountered in some cases of the last pattern. Moreover, inspite of the Connel suture penetrate the urinary bladder lumen,the suture material were covered by a mucosal layer, where there was epithelial regeneration around the suture material.

The reaction was very mild twards the coated polyglycolic acid in comparison to catgut. Similar findings were recorded by ECHEVERRIA and JIMENZ (1970); BORTHWICK (1973); EDLICH, et al. (1973); URDAHL (1975) and WINGFIELD and RAWLINGS (1979) while using the uncoated material. This may confirm that the coate improves the clinical characters of the suture material without inducing a pronounced tissue reaction.

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EXPLANATION OF FIGURES

Fig. 1: A slight adhesion between the omentum and one end of the suture line.

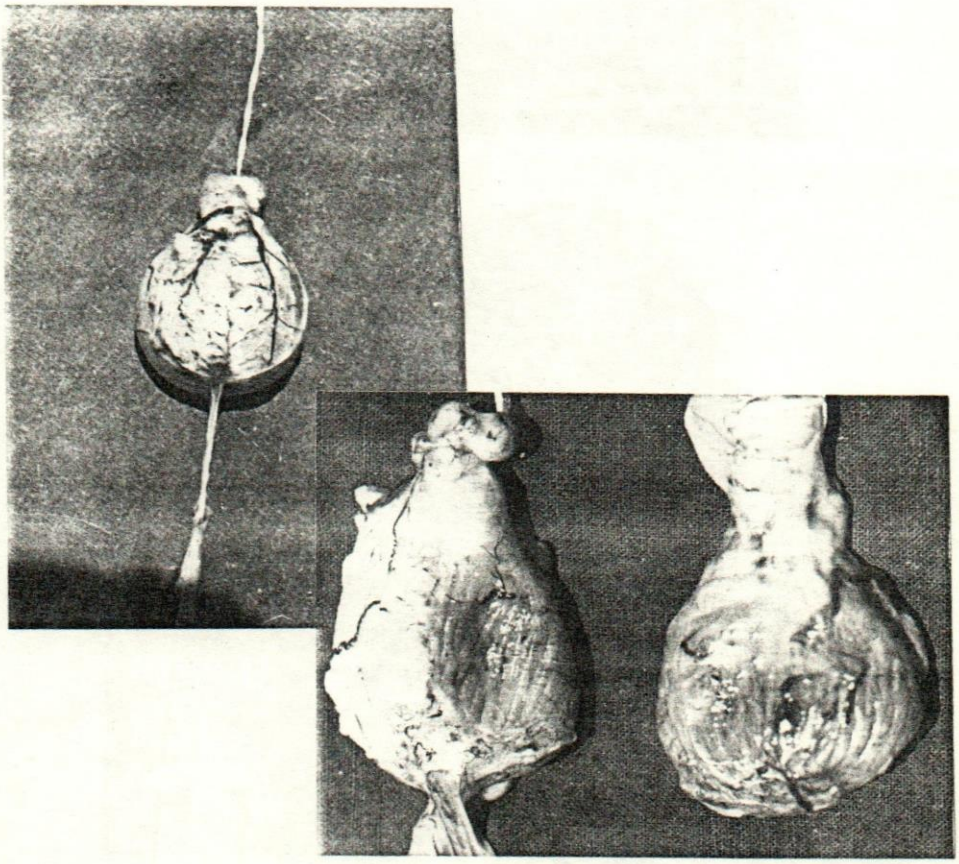
Fig. 2: Marked adhesions between the bladder apex and the omentum.

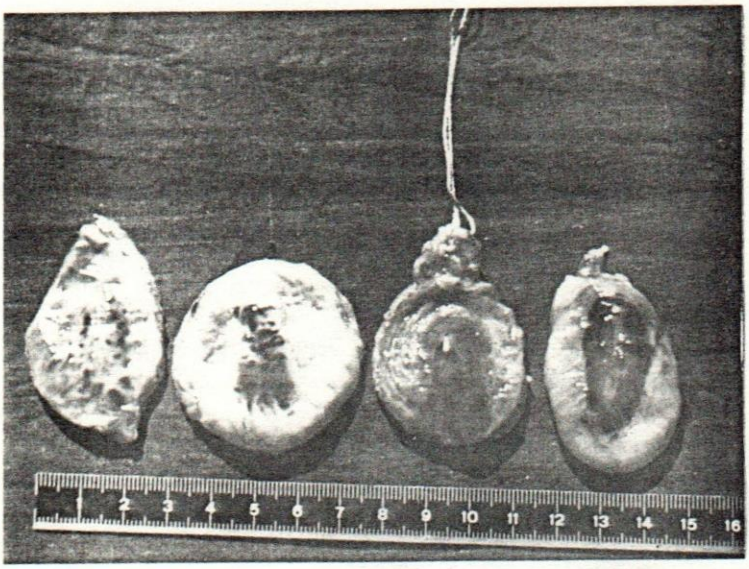
Fig. 3: The interior of the urinary bladder showing submucosal haemorrhage around the suture line.

Fig. 4: Urinary bladder showing severe subepithelial extravasations (H & E, X 250).

Fig. 5: Urinary bladder wall showing chronic inflammatory cellular infiltration (H & E, X 250).

Fig. 6: Urinary bladder wall showing re-epithelialized damaged focal area. (H & E, X 460).

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