



Original article

Role of preoperative retrograde enema on inflammatory and healing parameters in colonic anastomosis: experimental study in dogs[☆]



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ABSTRACT

Objective: The purpose of this experimental study was to compare the inflammatory and wound healing response of dogs submitted to colonic anastomosis with and without preoperative retrograde enema.

Methods: The study included two groups of 31 female dogs (*Canis familiaris*). G-I (control): no preoperative bowel preparation; G-II (study): preoperative retrograde enema using a 10% glycerin solution. All the animals were submitted to laparotomy and colotomy at 20 cm from the anal verge, followed by closure with a running extramucosal single-layer suture (Prolene® 000). The animals were then anesthetized and euthanized on the 7th ($n=10$) or 21st ($n=20$) postoperative day (POD) to remove the anastomosed colon segment for histological and immunohistochemical analysis evaluating the parameters: anastomotic edema, vasoproliferation, abdominal adhesions, type I and III collagen, nitric oxide and myeloperoxidase. The observed differences were analyzed with the Mann-Whitney test for nonparametric data and Student's *t* test for unpaired samples and parametric data.

Results: One animal from G-I and one from G-II died on POD 7 and POD 10 due to anastomotic complications and sepsis, respectively. The groups did not differ significantly with regard to inflammatory and healing parameters, although the levels of mature collagen were significantly lower in the animals submitted to preoperative bowel preparation.

[☆] Study carried out at Post-graduation program stricto sensu in Surgery, Surgery Department, Faculty of Medicine, Universidade Federal do Ceará (UFC), Fortaleza, CE, Brazil.

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Conclusion: It has been shown that both procedures are safe to be used, however, the group with bowel preparation showed a lower amount of mature collagen in the immediate post-operative period and may be constituted a preventive factor for surgical complications for this type of surgical procedure, although no evidence in this study could be determined.

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Papel do enema pré-operatório em parâmetro de inflamação e cicatrização em anastomose cólica: estudo experimental em cães

R E S U M O

Palavras-chave:

Enema
Cicatrização de feridas
Inflamação
Colágeno

Objetivo: O objetivo deste estudo experimental foi comparar a resposta inflamatória e cicatrização de feridas em cães submetidos a anastomose cólica com e sem enema retrógrada pré-operatório.

Métodos: O estudo incluiu dois grupos de 31 cães fêmeas (*Canis familiaris*). G-I (controle): sem preparo intestinal pré-operatório; G-II (estudo): Enema retrógrada pré-operatória com uma solução de glicerina a 10%. Todos os animais foram submetidos à laparotomia e colotomia a 20 cm da borda anal, seguido de fechamento em sutura extramucosa contínua (Prolene® 000). Os animais foram anestesiados e, em seguida, submetidos à eutanásia no 7º ($n = 10$) ou 21 ($n = 20$) pós-operatório (DPO) para remover o segmento de cólon anastomosado para análise histológica e imunohistoquímica avaliando os parâmetros: edema da anastomose, vasoproliferação, aderências abdominais, colagênio tipo I e III, o óxido nítrico e a mieloperoxidase. As diferenças observadas foram analisadas com o teste de Mann-Whitney para os dados não paramétricos e teste t de Student para amostras não pareadas e dados paramétricos.

Resultados: Um animal do GI e um do G-II morreu no dia 7 e 10º DPO devido a complicações de anastomose e sepse, respectivamente. Os grupos não diferiram significativamente em relação aos parâmetros inflamatórios e de cura, embora os níveis de colágeno maduro foram significativamente menores nos animais submetidos ao preparo intestinal pré-operatório.

Conclusão: Demonstrou-se que ambos os procedimentos são seguros para serem usados, no entanto, o grupo com a preparação do intestino mostrou uma menor quantidade de colágeno maduro no período pós-operatório imediato, podendo ser constituído um fator preventivo para complicações cirúrgicas para este tipo de procedimento cirúrgico, embora nenhuma evidência neste estudo.

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Introduction

Historically, colorectal surgical procedures have been associated with postoperative complications, especially prior to the advent of antibiotics in the 20th century.^{1,2} The practice of bowel preparation was first introduced in 1950 and was further popularized in the 1970s when cathartic substances were combined with oral antibiotics (macrolids) and metronidazole. Nevertheless, bowel preparation is also associated with complications, including dehydration and excessive flatulence.³ In fact, the use of bowel preparation (primarily enema) to prepare patients for colorectal procedures has been the object of much discussion in the literature over the past few years.³

The purpose of this experimental study was to compare the inflammatory and wound healing response of dogs submitted to colonic anastomosis with and without preoperative retrograde enema using a 10% glycerin solution.

Methods

The number of the protocol approved by the Research Ethics Committee was 65/2010 and the research was conducted in accordance with the ethical standards required.

The study included two groups of 31 female dogs (*Canis familiaris*) with an average weight of 12.01 kg (range: 5.75–25.0).

Group I (control): no preoperative bowel preparation administered.

Group II (study): preoperative bowel preparation (retrograde enema) using a 10% glycerin solution on the day before the procedure and on the day of the procedure.

Following anesthesia with ketamine hydrochloride, all the animals were submitted to individual digital rectal examination to determine bowel status according to the classification

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