



Journal of Coloproctology

www.jcol.org.br



Original Article

Evaluation of tensile strength of tissue adhesives made of fibrin and cyanoacrylate used as reinforcement of colon suture in “ex vivo” swine

Alexandre Venâncio de Sousa^a, Marcus Vinicius Henrique de Carvalho^b,
Roberto Anania de Paula^a, Evaldo Marchi^b, Juliana Querino Teixeira^{c,*},
Caroline Von Abel de Sousa^c, Daniel Perez^c

^a Colégio Brasileiro de Cirurgiões, Rio de Janeiro, RJ, Brazil

^b Faculdade de Medicina de Jundiaí (FMJ), Departamento de Cirurgia, Jundiaí, SP, Brazil

^c Faculdade de Medicina de Jundiaí (FMJ), Jundiaí, SP, Brazil

ARTICLE INFO

Article history:

Received 16 July 2017

Accepted 3 September 2017

Available online xxx

Keywords:

Tissue adhesives

Sutures

Rupture

Fibrin

ABSTRACT

Aim: To evaluate rupture pressures of tissue adhesives of cyanoacrylate (Omnex[®]) and fibrin (Evicel[®]), used as reinforcement in colonic suture from “ex vivo” swine.

Methods: Surgical procedures were performed in the Surgical Technique Laboratory. From a division in segments of 10 cm of descending colon and sigmoid colon from three “ex vivo” female swine, Landrace breed, which were resected in less than six hours after the slaughter time, 30 segments were selected, 10 of each animal. They were stored in saline solution 0.9% at 36 °C, being randomly allocated in three groups (Control, Evicel and Omnex), each one containing 10 segments.

Results: The lower and higher pressure values found in the groups Control, Evicel and Omnex were 36 mmHg and 41 mmHg, 70 mmHg and 90 mmHg, 90 mmHg and 120 mmHg, respectively. Containing statistical significance (p -value <0.0001) concerning the 2 to 2 comparisons (Control, Evicel and Omnex) with 95% trusting rate based on the application of the Turkey Method.

Conclusion: One concludes that the use of tissue adhesives in anastomoses colonic in an experimental animal model of “ex vivo” swine increased the anastomoses rupture pressures. Among the tested adhesives, cyanoacrylate presented higher rupture pressure in relation to fibrin adhesive.

© 2017 Sociedade Brasileira de Coloproctologia. Published by Elsevier Editora Ltda. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

* Corresponding author.

E-mail: julianaqteixeira@hotmail.com (J.Q. Teixeira).

<https://doi.org/10.1016/j.jcol.2017.09.415>

2237-9363/© 2017 Sociedade Brasileira de Coloproctologia. Published by Elsevier Editora Ltda. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Please cite this article in press as: Sousa AV, et al. Evaluation of tensile strength of tissue adhesives made of fibrin and cyanoacrylate used as reinforcement of colon suture in “ex vivo” swine. J Coloproctol (Rio J). 2017. <https://doi.org/10.1016/j.jcol.2017.09.415>

Avaliação da força tênsil de adesivos teciduais de Fibrina e Cianoacrilato usados como reforço de sutura de colo de suínos “ex vivos”

R E S U M O

Palavras-chave:
Adesivos teciduais
Suturas
Ruptura
Fibrina

Objetivo: Avaliar as pressões de ruptura dos adesivos teciduais de Cianoacrilato (Omnex[®]) e de Fibrina (Evicel[®]), usados como reforço em suturas colônicas de suínos “ex-vivo”.

Métodos: Os procedimentos cirúrgicos realizados foram realizados no Laboratório de Técnica Cirúrgica. A partir da divisão em segmentos de 10 cm do colo descendente e colo sigmoide de três suínas fêmeas ex-vivo, da raça Landrace, ressecados em tempo inferior a seis horas em relação ao momento do abate, foram selecionados 30 segmentos, 10 de cada animal. Foram armazenados em soro fisiológico 0,9% a 36 °C, alocando-se aleatoriamente esses segmentos em três grupos (Controle, Evicel e Omnex) com 10 segmentos cada.

Resultados: Os menores e maiores valores pressóricos encontrados nos grupos Controle, Evicel e Omnex foram 36 mmHg e 41 mmHg, 70 mmHg e 90 mmHg, 90 mmHg e 120 mmHg, respectivamente. Com significância estatística (Valor-p < 0,0001) para as comparações 2 a 2 (Sutura, Evicel e Omnex) com um intervalo de confiança de 95% construído a partir da aplicação do método de Turkey.

Conclusão: A partir desse estudo conclui-se que o uso de adesivos teciduais em anastomoses colônicas, em modelo experimental animal de suíno ex-vivo, aumentou as pressões de ruptura das anastomoses. Dentre os adesivos testados, o adesivo de Cianoacrilato apresentou maiores pressões de ruptura em relação ao adesivo de Fibrina.

© 2017 Sociedade Brasileira de Coloproctologia. Publicado por Elsevier Editora Ltda. Este é um artigo Open Access sob uma licença CC BY-NC-ND (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Introduction

Although the incidence of anastomotic dehiscence has decreased in recent years,¹ this complication remains a great concern among surgeons,¹⁻³ since its occurrence culminates in increased morbimortality. Adherences, fistulas and stenosis also consist in complications from entero-anastomoses that increase morbimortality when present.^{1,2}

Experimental studies with rats showed that intestinal anastomoses presented high resistance during the immediate postoperative period, however, they suffered an abrupt drop in resistance in the first postoperative days, followed by a gradual elevation.^{4,5}

Hogstrom in an experimental study with rats noted that the reduction of anastomoses resistance found in the first postoperative days may consist in an important risk factor for dehiscence and, meanwhile, the integrity of intestinal anastomoses is completely dependent on suture.⁵

The search for a complication-free anastomosis promoted not only the improvement of techniques and materials used, but also the development of supporting products in the conservation of tensile strength of the sutures.^{1-3,6,7}

In this scenario, tissue adhesives have played an important role in recent years.^{1-3,6,7}

Objectives

To assess the rupture pressures of the tissue adhesives of cyanoacrylate (Omnex[®]) and Fibrin (Evicel[®]) used as reinforcement in “ex vivo” swine colonic sutures.

Material and method

This research was approved by the Ethics and Research Commission of the Medical School of Jundiaí, under the protocol number of CEUA 133/2013.

Surgical procedures were performed at the Laboratory of Surgical Technique of the Medical School of Jundiaí.

Sample

From a division in segments of 10 cm of descending colon and sigmoid colon from three “ex vivo” female swine, Landrace breed, which were resected in less than six hours after the slaughter time, 30 segments were selected, 10 of each animal. They were stored in saline solution 0.9% at an approximate temperature of 36 °C, being randomly allocated in three groups (Control, Evicel and Omnex), each one containing 10 segments.

The colonic segments were acquired at a slaughterhouse located in the city of Cosmópolis, State of São Paulo.

Suture of segments of colon

The procedure was performed in the Control, Evicel and Omnex groups.

A two-centimeter cross-sectional incision was performed on the antimesenteric border, followed by single-point sutures, in a singular plane contemplating mucosa, submucosa, muscularis mucosa and serosa, with 3-0 polyglactin 910 (Vicryl[®]) wire. Five points at each incision were performed (Fig. 1).

Download English Version:

<https://daneshyari.com/en/article/8834440>

Download Persian Version:

<https://daneshyari.com/article/8834440>

[Daneshyari.com](https://daneshyari.com)