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Original Article

Differences between polydioxanone and poliglactin in intestinal anastomoses – a comparative study of intestinal anastomoses

Carlos Henrique Marques dos Santos[a,b,*], *Kerginaldo Gondim dos Santos Filho*[a], *Pedro Carvalho Cassino*[a], *Camila Vieira Chiquetti*[a], *Alvaro Pereira de Mello*[a], *Doroty Mesquita Dourado*[b]

[a] *Universidade Federal de Mato Grosso do Sul (UFMS), Hospital Universitário Maria Aparecida Pedrossian (HUMAP), Campo Grande, MS, Brazil*

[b] *Universidade Anhanguera (Uniderp), Campo Grande, MS, Brazil*

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ABSTRACT

Introduction: Intestinal anastomosis is a surgical practice constantly realized by surgeons worldwide. When the option is to perform manual anastomosis, which is still widely used for its low cost, the question arises as to the best material to be applied.

Objective: To compare polydioxanone and polyglactin threads for healing and tensile strength in intestinal anastomosis in rats.

Method: We used 25 rats Wistar; after anesthesia, in groups A and B (10 rats each), laparotomy was performed, transection of the ileum at 5 and 10 cm proximally to the ileocecal valve; in group A, anastomosis was performed with 4 separate extra mucosal sutures with polidioxanone; in group B, anastomosis was performed with polyglactin; in group C (5 rats), laparotomy and manipulation of the ileum were performed. After 21 days, the animals were anesthetized and submitted to euthanasia. The specimens were sent for histopathological study and tensile strength analysis. Statistical analysis was performed using the Turkey and Student's *t* tests, with a significance of $p < 0.05$.

Results: The results showed that in the tensile strength analysis, there were no significant differences between them. The histological analysis showed significant differences between the cicatrization pattern, where polydioxanone caused less fibrosis than polyglactin.

Conclusion: Polydioxanone caused less fibrosis than polyglactin in intestinal anastomoses of rats.

* *Corresponding author.*
E-mail: chenriquems@yahoo.com.br (C.H. Santos).

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Diferenças entre polidioxanona e poliglactina em anastomoses intestinais – estudo comparativo de anastomoses intestinais

Palavras-chave:
Anastomose cirúrgica
Polidioxanona
Poliglactina 910
Ratos
Intestino delgado

RESUMO

Introdução: Anastomose intestinal é uma prática cirúrgica constantemente realizada pelos cirurgiões em todo o mundo. Quando a opção é a anastomose manual – um procedimento ainda amplamente empregado, graças a seu baixo custo – coloca-se o problema de saber qual é o melhor material a ser aplicado.
Objetivo: Comparar fios de polidioxanona e poliglactina quanto à cicatrização e resistência à tração em anastomoses intestinais em ratos.
Método: Utilizamos 25 ratos Wistar; depois da anestesia, foi realizada laparotomia nos grupos A e B (10 ratos cada), com transecção do íleo a 5 e 10 centímetros proximalmente à válvula ileocecal; no grupo A, a anastomose foi realizada com 4 suturas de mucosa separadas com uso de polidioxanona; no grupo B, a anastomose foi realizada com poliglactina; no grupo C (5 ratos), foi realizada apenas a laparotomia e manipulação do íleo. Transcorridos 21 dias, os ratos foram anestesiados e submetidos à eutanásia. Os espécimes foram enviados para estudo histopatológico e análise de resistência à tração. A análise estatística foi efetuada com a aplicação dos testes de Tukey e de *t* de Student, com significância de $p < 0,05$.
Resultados: Os resultados demonstraram que, na análise de resistência à tração, não foram observadas diferenças significativas entre os materiais. A análise histológica revelou diferenças significativas entre padrões de cicatrização, em que polidioxanona causou menos fibrose *versus* poliglactina.
Conclusão: : Polidioxanona causou menos fibrose *versus* poliglactina em anastomoses intestinais realizadas em ratos.

Introduction

Many methods of intestinal suture have been performed since the earliest days of surgery. However, only in the year 1264, Ruggiero presented the surgical practice of the digestive suture, using silk threads. Richerand, in the nineteenth century, presented the theory of incoherence of the union of serosa with mucosa, beginning the idea of performing an intestinal anastomosis joining the extramucosal layers.[1]

A feared complication in this type of anastomosis, dehiscences and fistulas represent an important problem for specialists dealing with the digestive tract, since they can lead to severe electrolyte depletion, acid-base imbalance, infection and severe malnutrition, with a long hospital stay and the high cost of treatment. Several factors such as malnutrition, infection, ischemia, *etc.* may be related, but the technical failure and type of anastomosis performed must also be considered.[2]

Intestinal anastomoses can be performed with one or two continuous layers, separate stitches, with an invaginating or evading end result of the edges of the anastomosis. Various materials are used to make these sutures, such as: silk, cotton, linen and synthetic threads. The most commonly used manual technique is single-layer, extra-mucosal, with monofilament yarns, while many use mechanical staplers, which have the advantage of shortening operative time, although they increase the cost of the procedure.[3]

There is no evidence that stapled anastomosis is superior to manual. In fact, the stapled suture may even lead to a higher rate of postoperative bleeding in some situations.[4,5] Despite this, stapling was a very important advance in intestinal anastomoses and should be increasingly improved. However, there is still room for manual anastomosis, especially since it allows for lower costs.

Garude et al.[6] demonstrated that there is no benefit in performing intestinal anastomosis in two planes, the anastomosis in an extramucosal single plane being as efficient as that, but performed more quickly and economically.

Bernis-Filho et al.[7] compared cotton, polyglecaprone and polyglactin threads in intestinal anastomoses of dogs and observed no difference between these materials. It would be expected that multifilament threads such as cotton and polyglactin caused a greater tissue reaction, which was not proven when compared to polyglecaprone. Although polydioxanone and polyglecaprone are both absorbable and monofilamentary, they have different characteristics, and polydioxanone has been preferred for intestinal anastomosis, although there is no scientific evidence of its superiority. Thus, it remains to be seen whether there is any difference between the type of material used for such anastomoses, and the objective of this study is to compare polydioxanone and polyglactin threads for healing and tensile strength in intestinal anastomoses in rats.

Objective

To compare polydioxanone and polyglactin threads for healing and tensile strength in intestinal anastomoses in rats.

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