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Triclosan sutures for surgical site infection in colorectal cancer

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ABSTRACT

Background: Among all procedures, surgical site infections (SSIs) in colorectal surgery continue to have the highest rate, accounting for 5%-45%. To prevent the bacterial colonization of suture material, which disables local mechanisms of wound decontamination, triclosan-coated sutures were developed. We assessed the effectiveness of triclosan-coated sutures used for skin closure on the rate of SSIs in colorectal cancer surgery.

Methods: Until August 2012, we used conventional methods for skin closure in colorectal cancer surgery at the Department of Gastroenterological Surgery, Fukuoka University Faculty of Medicine. Therefore, for the control group, we retrospectively collected surveillance data over a 1.5-y period. From September 2012, we began using triclosan-coated polydioxanone antimicrobial sutures (PDS plus) for skin and fascia closure. Hence, we collected data for the study group from September 2012 to October 2013. Differences in baseline characteristics and selection bias were adjusted using the propensity score-matching method.

Results: A total of 399 patients who underwent colorectal surgery were included in this study. There were 214 patients in the control group and 185 patients in the study group. Baseline patient characteristics were similar between the propensity score-matched groups. The incidence of SSIs was less in the study group. Multivariate logistic regression analysis showed that the site of the procedure, laparoscopic surgery, and using triclosan-coated sutures remained the independent predictors of SSIs.

Conclusions: The use of triclosan-coated sutures was advantageous for decreasing the risk of SSIs after colorectal surgery.

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Introduction

Colorectal surgery continues to have the highest frequency of surgical site infections (SSIs) among all surgical procedures

with a reported incidence range of 5%-45%.¹⁻³ SSIs are associated with an increased risk of morbidity, readmission, intensive care unit stay, and mortality.⁴

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Table 1 – Baseline clinical patient characteristics before and after propensity matching.

Characteristics	Before matching			After matching		
	Control (n = 214)	Study (n = 185)	P value	Control (n = 93)	Study (n = 93)	P value
Age*, y	67.07 ± 12.23	67.79 ± 13.18	0.567	67.45 ± 11.81	66.01 ± 13.47	0.439
Sex			0.358			0.277
Male, n (%)	139 (65.0)	116 (62.7)		56 (60.2)	51 (54.8)	
Female, n (%)	75 (35.0)	69 (37.3)		37 (39.8)	42 (45.2)	
Body mass index*, kg/m ²	21.58 ± 3.77	21.64 ± 3.31	0.880	22.33 ± 3.62	21.49 ± 3.41	0.107
Diabetes mellitus, n (%)	33 (15.4)	42 (22.7)	0.042	18 (19.4)	10 (10.8)	0.075
Steroid treatment, n (%)	1 (0.5)	2 (1.1)	0.445	0 (0.0)	0 (0.0)	
Smoker, n (%)	32 (15.0)	87 (47.0)	<0.001	21 (22.6)	25 (26.9)	0.305

*Mean ± SD.

The Centers for Disease Control and Prevention (CDC) published the guidelines for the prevention of SSIs in 1999.⁵ From that time, awareness regarding the need to prevent SSIs has become ubiquitous. Risk factors for SSIs in colorectal cancer surgery include obesity, diabetes, type of surgery (colon or rectum), technique of surgery (open or laparoscopic), duration of surgery, and emergency surgery.^{2,6,7} The current consensus to prevent SSI includes the use of antibiotic prophylaxis, syringe pressure irrigation, and subcutaneous drainage.⁸⁻¹¹

Closing the abdominal fascia with triclosan-coated sutures is a novel method to reduce the incidence of SSI because any foreign material increases the risk of such infections. Both *in vitro* and *in vivo* studies have shown that triclosan-coated sutures interfere with microbial lipid synthesis and subsequently attenuate bacterial growth and colonization in a broad spectrum of patients.^{12,13}

We previously reported that the use of triclosan-coated polydioxanone antimicrobial sutures (PDS Plus; Ethicon, Johnson & Johnson, Livingston, Scotland, UK) reduced the risk of SSIs after gastroenterologic surgery.¹⁴ However, the efficacy

of PDS Plus after colorectal cancer surgery remains controversial. Therefore, the aim of this study was to evaluate the efficacy of triclosan-coated sutures in lowering the incidence of SSIs associated with abdominal closure after colorectal cancer surgery.

Materials and methods

Patients and data collection

The present study was conducted in accordance with the principles of the Declaration of Helsinki, and ethical approval for the study was obtained from the Ethics Committee of Fukuoka University (approval no. 12-7-06). Until August 2012, we used conventional methods for skin closure during colorectal cancer surgery at the Department of Gastroenterological Surgery, Fukuoka University Faculty of Medicine. Therefore, for the control group, we retrospectively collected surveillance data over a 1.5-y period. From September 2012, we began using PDS plus for skin and fascia closure. Hence, we

Table 2 – Intraoperative patient characteristics before and after propensity matching.

Characteristics	Before matching			After matching		
	Control (n = 214)	Study (n = 185)	P value	Control (n = 93)	Study (n = 93)	P value
ASA score			<0.001			
1-2, n (%)	187 (87.4)	184 (99.5)		93 (100.0)	93 (100.0)	
3-4, n (%)	27 (12.6)	1 (0.5)		0 (0.0)	0 (0.0)	
Procedure			0.009			0.222
COLO, n (%)	130 (60.7)	134 (72.4)		57 (61.3)	63 (66.7)	
REC, n (%)	84 (39.3)	51 (27.6)		36 (38.7)	30 (33.3)	
Laparoscopic, n (%)	47 (22.0)	64 (34.6)	0.005	34 (36.6)	31 (33.3)	0.379
Duration of surgery, min*	179.94 ± 84.81	172.76 ± 103.04	0.446	182.08 ± 79.07	188.22 ± 105.58	0.654
Blood loss, mL*	201.29 ± 330.85	107.65 ± 151.23	<0.001	118.13 ± 179.84	135.65 ± 164.52	0.654
Transfusion, mL*	27.10 ± 117.09	19.89 ± 113.83	0.536	10.75 ± 79.81	15.05 ± 86.26	0.725

COLO = colon surgery; REC = rectal surgery.

*Mean ± SD.

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