Bull. Tokyo Med. Dent. Univ., 39: 31–34, 1992

ENTEROCOLITIS DUE TO METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS*—REPORT OF TWO CASES

BY

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Abstract

Two cases of postoperative enterocolitis due to methicillin-resistant *Staphylococcus aureus* (MRSA) after gastrectomy were experienced. Case 1: A 59-year-old male underwent subtotal gastrectomy for advanced gastric cancer. Diffuse peritonitis progressed after the first operation, so reoperation for drainage was required. Two days after the second operation, a profuse watery diarrhea developed. Case 2: A 46-year-old male underwent total gastrectomy for early gastric cancer. On the fourth postoperative day, frequent vomiting and cholera-like diarrhea started, followed by profound shock several hours later. Both cases were treated successfully by the administration of vancomycin.

Stool cultures of both cases revealed MRSA and it had the same minimal inhibitory concentration, coagulase type and enterotoxin type, so that nosocomial infection was indicated.

Key words: MRSA, Enterocolitis, Gastrectomy

Introduction

The strains of methicillin-resistant *Staphylococcus aureus* (MRSA) were first reported in England in 1961 (1), immediately after the introduction of methicillin for clinical use, and in the late 1970s infection due to MRSA was prevalent in the United States and the European countries. It was at the beginning of the 1980s in Japan that MRSA infection came to attract attention as a postoperatie and nosocomial problem. Enterocolitis due to MRSA, which is one of the most serious conditions, is not a rare postoperative complication in Japan. We report on two cases of enterocolitis induced by MRSA after gastrectomy, which were successfully treated.

Case Report

Case 1: A 59-year-old male received an intravenous administration of oxacephem for 8 days after subtotal gastrectomy for advanced gastric cancer at the antrum pyloricum. On the 10th postoperative day, as localized peritonitis with high grade fever developed, cefotiam (CTM) and amikacin (AMK) were replaced for the previous antibiotics. Two days later, anastomotic insufficiency was identified. With no efficacy of CTM and AMK, im-

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Received for publication, January 27, 1992.

pipenem/cilastatin and piperacillin were administered instead. In spite of these antibiotic therapies, diffuse peritonitis progressed, necessitating the reoperation for drainage. Two days after the second operation, a profuse watery diarrhea developed with a fever of 39°C and pulse rate of 110 per minute. Stool culture revealed abundant MRSA which was sensitive to AMK, minocycline (MINO), cephaloridine (CER) and netilmicine (NTL). Oral administration of MINO and NTL was started. Three days after the administration of vancomycin (VCM), the stool culture yielded no colonies of MRSA and diarrhea ceased.

Case 2: A 46-year-old male had total gastrectomy for early gastric cancer at the cardiac region. Postoperatively, administration of CTM was started. On the third postoperative day he had a high fever and AMK was administered in adition to CTM. On the next day, despite the treatment, high fever continued and the pulse rate rose to 170 per minute. At midnight on the same day, after frequent vomiting, cholera-like diarrhea started and developed resulting in profound shock 5 hours later. With massive intravenous replacement for the lost fluid, emergent laparotomy was performed under the possible diagnosis of peritonitis. The pro-

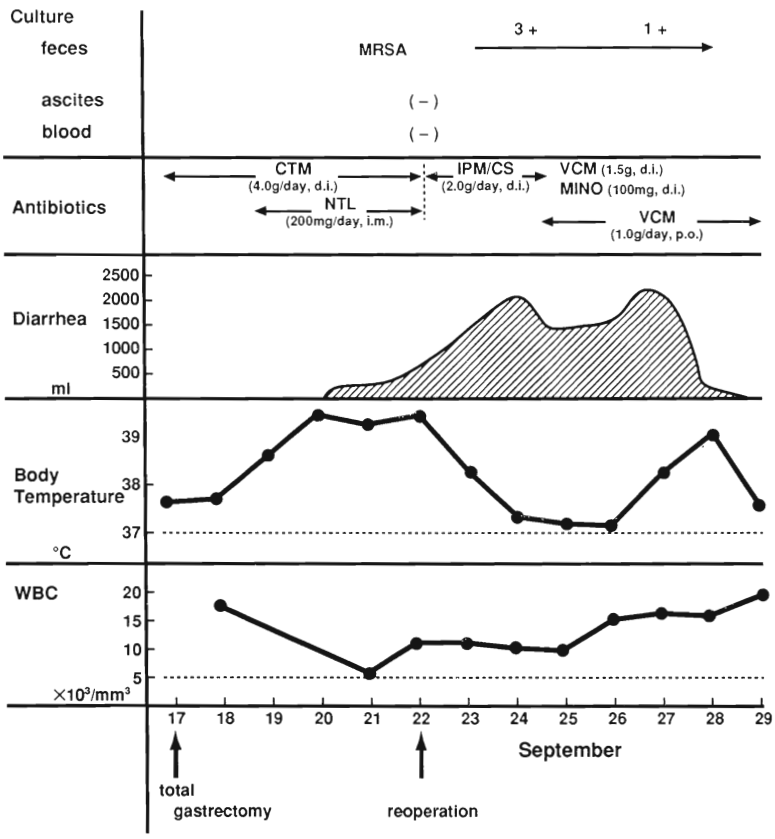

Figure Clinical course of Case 2. Characteristic signs of MRSA enterocolitis, i.e., temperature elevation and a large amount of watery diarrhea (The maximum volume of feces was 2070 ml a day.). Diarrhea came to cease two days after starting to administer VCM.

ximal small intestine was edematous but without findings of peritonitis. The watery diarrhea, which contained a lot of white flakes of mucus, continued with a maximum volume of 2070 ml a day and thereafter multiple organ failure (MOF), acute renal failure, liver failure and disseminated intravascular coagulation (DIC), developed. Dialysis, liver protection therapy and management of DIC were started. Three days after the second operation, according to the experience of Case 1, diagnosis of MRSA enterocolitis was made before stool culture, followed by VCM administration, 1.5 g intravenously and 1.0 g through a nasogastric tube. Two days after the starting of VCM administration the diarrhea gradually came to cease and the general condition improved (Figure).

Discussion

In recent years nosocomial outbreak of MRSA has become a major infection control problem in japan. Especially in the surgical service, enterocolitis due to MRSA attracts attention as a postoperative infection. According to the nationwide questionnaire survey in Japan, enterocolitis due to MRSA was the most frequent in patients after gastrectomy for gastric cancer (2), on the other hand such cases are not so frequently observed in the United States and the European countries. The lower acidity of the gastric contents in the stomach with cancer or no acidity after gastrectomy, in addition to the administration of antibiotic agents and hypoactive peristalsis after laparotomy, is thought to make *Staphylococcus aureus* invade more easily the intestinal tract and evoke enterocolitis (3, 4, 5). The symptoms of MRSA enterocolitis manifest usually between the second and seventh postoperative day, based on the fact that the bacterial flora in the intestinal tract begins to change in 24 hours after the administration of antibiotic agents and completely changes in 2 or 3 days (6). MRSA enterocolitis accompanies severe cholera-like diarrhea, abdominal distention with vomiting, high fever and tachycardia in the incipient stage. Unless it is recognized and treated, profound shock is inevitable and some are rapidly followed by death (7). Although, in Case 2, enterocolitis due to MRSA developed, resulting in profound shock followed by MOF, administration of VCM and intensive care showed improvement in the patient.

The strain of MRSA detected in Case 2 had the same minimal inhibitory concentration, coagulase type and enterotoxin type as in Case 1 (Table), so that nosocomial infection can not be neglected.

When the patient develops dehydration with severe cholera-like diarrhea two to

Table Stool culture of Cases 1 and 2 had the same minimal inhibitory concentration, coagulase type and enterotoxin type, so that nosocomial infection was indicated.

	MIC(μg/mℓ)											
	DMPPC	CTM	CZON	CLDM	MINO	FOM	OFLX	GM	TOB	VCM	CMZ	IPM
Case 1	>100	>100	>100	>100	12.5	>100	100	50	>100	1.56	100	25
Case 2	>100	>100	>100	>100	12.5	>100	100	50	>100	1.56	100	50

	Coagulase type	Enterotoxin type
Case 1	II	A
Case 2	II	A

seven days after gastrectomy, enterocolitis due to MRSA should not be neglected and management of dehydration should be assisted by frequent stool cultures. Early diagnosis of enterocolitis due to MRSA leads to early adequate antibiotic therapy and the clinical course would improve dramatically.

VCM is apparently at present more often effective against MRSA. Patients with enterocolitis due to MRSA are susceptible to renal insufficiency because of dehydration. VCM is almost completely eliminated through the kidneys and not removed by hemodialysis, so in such cases, the serum half-life of VCM is prolonged and the incidence of nephrotoxicity and ototoxicity is noted. Wheares absorption from the gastrointestinal tract is negligible, so oral administration is preferable as long as the MRSA is revealed only by stool culture.

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