Infliximab as Rescue Therapy in Severe to Moderately Severe Ulcerative Colitis: A Randomized, Placebo-Controlled Study

GUNNAR JÄRNEROT,* ERIK HERTERVIG,† INGALILL FRIIS–LIBY,§ LARS BLOMQUIST,¶ PER KARLÉN,¶ CRISTER GRÄNNÖ,## MOGENS VILIEN,** MAGNUS STRÖM,†‡ ÅKE DANIELSSON,§§ HANS VERBAAN,¶¶ PER M. HELLSTRÖM,‖ ANDERS MAGNUSON,¶¶ and BENGT CURMAN*

*Department of Medicine, Division of Gastroenterology, Örebro University Hospital, Örebro, Sweden; ‡Department of Medicine, Division of Gastroenterology, Lund University Hospital, Lund, Sweden; §Department of Medicine, Division of Gastroenterology, Sahlgrenska University Hospital, Gothenburg, Sweden; †Department of Gastroenterology and Hepatology, Karolinska University Hospital, Stockholm, Sweden; ††Department of Medicine, Division of Gastroenterology, South Hospital, Stockholm, Sweden; †‡Department of Medicine, Division of Gastroenterology, Ryhov Hospital, Jönköping, Sweden; **Department of Medicine, Division of Gastroenterology, West Zealand Hospital, Slagelse, Denmark; †§Department of Molecular and Clinical Medicine, Division of Gastroenterology and Hepatology, Faculty of Health Sciences, Linköping, Sweden; †¶Department of Medicine, Division of Gastroenterology, Malmö General University Hospital, Malmö, Sweden; ‡‡Department of Medicine, Division of Gastroenterology and Hepatology, Faculty of Health Sciences, Linköping, Sweden; and ¶¶Unit of Statistics and Epidemiology, Centre for Clinical Research, Örebro University Hospital, Örebro, Sweden

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Background & Aims: Despite treatment with corticosteroids, severe to moderately severe attacks of ulcerative colitis have a high colectomy rate. We intended to find a rescue therapy other than cyclosporin A, which imposes a high risk of side effects and cyclosporine-related mortality. Methods: This was a randomized double-blind trial of infliximab or placebo in severe to moderately severe ulcerative colitis not responding to conventional treatment. Patients were randomized to infliximab/placebo either on day 4 after the initiation of corticosteroid treatment if they fulfilled the index criteria for fulminant ulcerative colitis on day 3 or on day 6–8 if they fulfilled index criteria on day 5–7 for a severe or moderately severe acute attack of ulcerative colitis. Results were analyzed according to the intention-to-treat principle. The primary end point was colectomy or death 3 months after randomization. Secondary end points were clinical and endoscopic remission at that time in patients who did not undergo operation. Results: Forty-five patients were included (24 infliximab and 21 placebo) in severe to moderately severe ulcerative colitis not responding to conventional treatment. Patients were randomized to infliximab/placebo either on day 4 after the initiation of corticosteroid treatment if they fulfilled the index criteria for fulminant ulcerative colitis on day 3 or on day 6–8 if they fulfilled index criteria on day 5–7 for a severe or moderately severe acute attack of ulcerative colitis. Results were analyzed according to the intention-to-treat principle. The primary end point was colectomy or death 3 months after randomization. Secondary end points were clinical and endoscopic remission at that time in patients who did not undergo operation.

Results: Forty-five patients were included (24 infliximab and 21 placebo). No patient died. Seven patients in the infliximab group and 14 in the placebo group had a colectomy (P = .017; odds ratio, 4.9; 95% confidence interval, 1.4–17) within 3 months after randomization. No serious side effects occurred. Three patients in the placebo group required operation for septic complications. Conclusions: Infliximab 4–5 mg/kg is an effective and safe rescue therapy in patients experiencing an acute severe or moderately severe attack of ulcerative colitis not responding to conventional treatment.

Traditionally, acute attacks of ulcerative colitis (UC) have been treated intensively with high doses of corticosteroids intravenously (IIVT). Despite IIVT, severe attacks had a high colectomy rate varying from 38% to 47% in 2 frequently quoted series.1,2 Of patients with UC affecting the entire colon, 60% had surgery within 3 months.2 Also, a moderately severe attack was associated with a risk for operation in approximately 20% of the patients.2

Cyclosporin A (CyA) was shown to be an effective rescue therapy in acute attacks of UC not responding to steroids.3 However, this increases the risk of side effects4 and of CyA-related mortality.5,6 For this reason, CyA has not been adopted as rescue therapy for patients with failed steroid treatment in Sweden and most Danish centers, because the risks were considered greater than those for surgical therapy.

Infliximab (Remicade; Centocor Inc, Malvern, PA) has become an established treatment in Crohn’s disease (CD). It is a chimeric monoclonal antibody to human tumor necrosis factor (TNF)-α that is constructed by linking the variable regions of a mouse antihuman TNF mono-
clonal antibody to human immunoglobulin G1 with light \( \kappa \) chains.\(^7\) TNF-\( \alpha \) has also been shown to play an important role in the inflammatory process in UC. Increased levels of TNF-\( \alpha \) have been found in feces from patients with active UC.\(^8\) The TNF-\( \alpha \) reactivity in UC was most pronounced subepithelially, whereas in CD expression it has also been found deeper in the mucosa or submucosa.\(^9\) The correlation between TNF-\( \alpha \) expression and the histological findings was good but was less so with the endoscopic appearance.\(^10\) Normally the inflammatory response to an increased TNF-\( \alpha \) production is counteracted by inhibitors. One study strongly indicated that in inflammatory bowel disease, the production of TNF-\( \alpha \) inhibitors is down-regulated.\(^12\)

Thus, there is good theoretical evidence to test infliximab also in acute attacks of UC. Only 1 small placebo-controlled study has been published, and it was stopped because of slow enrollment.\(^13\) Three uncontrolled studies support the effect of infliximab in acute attacks of UC.\(^14\)–\(^16\) In a prospective uncontrolled study, 8 of 11 (73\%) patients with severe UC similar to those included in the present placebo-controlled study escaped immediate colectomy.\(^16\)

**Methods**

**Study Design**

This study engaged patients with an acute severe or moderately severe attack of UC that did not respond quickly to IIVT. The study had a parallel design so that half of the patients were randomized to additional treatment with infliximab to the ongoing corticosteroid therapy, and the other half were randomized to additional placebo.

**Clinical Indices**

The Seo index\(^17\) for the preceding day was calculated from the following formula:

\[
60 \times \text{blood in feces} + 13 \times \text{bowel movements/day} + 0.5 \times \text{ESR} - 0.4 \times \text{Hb(g/l)} - 1.5 \times \text{albumin(g/l)} + 200,
\]

where ESR indicates erythrocyte sedimentation rate and Hb indicates hemoglobin. Constants were as follows: for blood in feces, 0 indicated none and 1 indicated present; for bowel movements, 0 indicated 0–3; 1 indicated 4; 2 indicated 5–7; and 3 indicated \( \geq 8\). A value \(< 150\) corresponds to remission or mild UC, 150–220 corresponds to moderately severe UC, and \( > 220\) corresponds to severe UC.

The fulminant colitis index\(^18\) was calculated on day 3 after the institution of IIVT according to the following formula:

\[
\text{number of bowel movements/day} + (0.14 \times \text{CRP} > 8 \text{mg/L}),
\]

where CRP indicates C-reactive protein. Seventy-two percent of patients with a value \( \geq 8.0\) had a colectomy.

**Patients**

Only patients with a definite or strong suspicion of UC were screened. Inclusion criteria were age 18–75 years, a diagnosis of certain or probable UC verified by a typical clinical history, appearance on endoscopy, and exclusion of an infectious cause. At hospitalization, patients had a severe or moderately severe attack of UC according to the Seo index.\(^17\) For treatment with infliximab/placebo, the patients had to have a fulminant colitis index\(^18\) \( \geq 8.0\) on day 3 after institution of IIVT or a Seo index on day 5, 6, or 7 that was compatible with a severe or moderately severe attack of UC that was not responding to corticosteroid treatment.

Exclusion criteria were age \(< 18\) or \( > 75\) years, pregnancy or planned pregnancy in the next 12 months, breast-feeding unless it was stopped, known or probable Crohn’s colitis, infectious colitis, ongoing infection such as an abscess, central line infection, febrile urinary tract infection, active tuberculosis, or exposure to tuberculosis. A pulmonary radiograph was to precede infliximab/placebo. If there were signs of past tuberculosis or a primary complex, prophylactic treatment against tuberculosis was to be given. PPD tests were not performed. Furthermore, multiple sclerosis, malignancy, heart failure or treated heart failure, earlier treatment with infliximab or another antibody, another disease according to the investigator’s judgment, psychiatric disease, alcoholism, or anything else whereby the patient was judged incapable of completing the trial resulted in exclusion.

**Recruitment and Randomization**

Approximately 40 Swedish and Danish centers located within 8 hospital regions expressed an interest in participation. Finally, 9 Swedish centers and 1 Danish center, covering 7 hospital regions, recruited patients. In each of the regions, a local randomization list was placed in 1 pharmacy. Randomization, which was performed in blocks of 4, was known only by the statistician.

Patients to be treated were reported to the pharmacy with their birth number, name, and weight for correct dosing. Preparation of the solution for infusion was performed in the pharmacy and delivered to the ward to blind the investigator.

The day of hospitalization was denoted as day 0. Bowel movements and fecal blood were registered daily, and body temperature and heart rate were recorded twice daily. Blood samples were drawn for hematology, liver function tests, albumin, CRP, and erythrocyte sedimentation rate. Fecal samples were sent for analyses of possible pathogens and *Clostridium difficile* toxin, which gave the laboratory 3–4 days to finish the analysis. No sample was positive after that time. Analysis for parasites was performed when clinically indicated. Biopsies were not performed to exclude cytomegalovirus infection. A plain abdominal and lung radiograph was taken. A severity index using the criteria of Seo et al\(^17\) was calculated on day 0. Patients with an index of \( > 150\), corresponding to severe to
moderately severe UC, were potential candidates for enrollment if IIVT failed. IIVT was started on day 0.

During days 0–3, a colonoscopy was performed to determine the extent and severity of disease according to GETAID (Groupe d’Étude Thérapeutique des Affections Inflammatoires Digestives) criteria. Endoscopic inflammation was graded as severe, moderately severe, mild, or in remission.

After day 0, daily monitoring continued. On the morning of day 4, the fulminant colitis index was calculated. When it was ≥8, the patient was randomized to infliximab/placebo. If the fulminant colitis index was <8, then IIVT continued. On the mornings of days 6, 7, and 8, the Seo index was calculated for the preceding day. If the index was >150 on any of these days, the patient was randomized to infliximab/placebo. There were no new inclusions after day 8.

**Treatment**

On day 0, IIVT with betamethasone 4 mg intravenously twice daily was started. No rectal treatment was given. When a patient was randomized to infliximab/placebo, a dose as close as possible to 5 mg/kg was given as a slow infusion (Table 1).

The patients were monitored clinically on a daily basis by the gastroenterologist and the surgeon. Decisions about continued medical treatment or emergency colectomy were made on clinical grounds.

When switching to oral medication, prednisolone 40 mg daily was given with a dose reduction of 5 mg/day each week. Maintenance treatment with a mesalamine-based drug was started or continued. Azathioprine 1.5–2 mg/kg body weight could be added according to the individual investigator’s judgment. As prophylaxis against opportunistic infections, trimethoprim 160 mg and sulfamethoxazole 800 mg was prescribed daily for 8 weeks.

In patients who did not receive surgical therapy, a new endoscopy was performed 10–14, 30, and 90 days after the infliximab/placebo infusion. At the same time, blood tests were taken, and the Seo index was calculated.

**Outcome Measures**

All analyses were conducted on an intention-to-treat basis. The primary end point was colectomy or death within 90 days after infusion. Secondary end points were clinical remission according to the Seo index and endoscopic remission 1 and 3 months after the infliximab/placebo infusion.

The study was also designed to provide information on the importance of the endoscopic appearance for outcome, the possible influence of infliximab on the postoperative course, and a prospective evaluation of the fulminant colitis index. However, these were not considered hard end points.

**Ethics**

The study was performed according to the Helsinki Declaration of 1975, as revised in 1983. The study protocol was approved by the research ethics committee for each center and by the Swedish and Danish medical products agencies. All patients gave written informed consent before recruitment.

**Statistics**

On the basis of published results, it was assumed that 35% in the infliximab group and 60% in the placebo group would have a colectomy. Seventy patients in each group would provide a statistical power of 80% and a significance level at 5%. It was planned that interim analysis would be performed and that the future of the study would be decided after 70 patients had been treated. The inclusion time was calculated as 1.5–2 years.

**Table 1.** Dosing of Infliximab

<table>
<thead>
<tr>
<th>No. ampoules</th>
<th>Dose (mg)</th>
<th>Weight (kg)</th>
<th>Dose given (mg/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>200</td>
<td>40–49.9</td>
<td>5–4</td>
</tr>
<tr>
<td>2+</td>
<td>300</td>
<td>50–59.9</td>
<td>5–5^a</td>
</tr>
<tr>
<td>3</td>
<td>400</td>
<td>60–74.9</td>
<td>5–4</td>
</tr>
<tr>
<td>4</td>
<td>500</td>
<td>100–125</td>
<td>5–4</td>
</tr>
</tbody>
</table>

^aOnly weight interval for which an ampoule had to be divided.

**Table 2.** Population Demographics and Disease Characteristics at Baseline

<table>
<thead>
<tr>
<th>Variable</th>
<th>Infliximab (n = 24)</th>
<th>Placebo (n = 21)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male/female</td>
<td>16/8</td>
<td>8/13</td>
</tr>
<tr>
<td>Age, y, mean (range)</td>
<td>37.5 (20–60)</td>
<td>36.2 (19–61)</td>
</tr>
<tr>
<td>Smokers</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Earlier known UC/first attack of UC</td>
<td>21/3</td>
<td>12/9</td>
</tr>
<tr>
<td>Extent of UC, total/extensive/distal</td>
<td>9/9/6</td>
<td>10/8/3</td>
</tr>
<tr>
<td>Seo index, day 0, mean (SD)</td>
<td>212 (30)</td>
<td>218 (30)</td>
</tr>
<tr>
<td>Included on fulminant colitis/Seo index</td>
<td>15/9</td>
<td>13/8</td>
</tr>
<tr>
<td>Fulminant colitis index, mean (range)</td>
<td>12.7 (8.1–22.5)</td>
<td>13.1 (8.1–25.3)</td>
</tr>
<tr>
<td>Seo index, mean (range)</td>
<td>196 (155–225)</td>
<td>195 (158–230)</td>
</tr>
<tr>
<td>Endoscopy at inclusion, severe/moderately severe inflammation</td>
<td>9/15</td>
<td>6/15</td>
</tr>
<tr>
<td>Hb, g/L, median (range)</td>
<td>130 (63–165)</td>
<td>119 (71–157)</td>
</tr>
<tr>
<td>Thrombocytes, 10^9/L, median (range)</td>
<td>381 (154–763)</td>
<td>444 (252–1131)</td>
</tr>
<tr>
<td>Albumin, g/L, median (range)</td>
<td>31 (15–48)</td>
<td>32 (16–48)</td>
</tr>
<tr>
<td>CRP, mg/L, median (range)</td>
<td>65 (5–296)</td>
<td>44 (8–324)</td>
</tr>
</tbody>
</table>

Hb, hemoglobin; CRP, C-reactive protein.
Categorical data were analyzed with the Fisher exact test (2-sided). The log-rank test, paired t-test (2 sided), and logistic regression analysis were also used as appropriate. Because this was an interim analysis, to reduce the risk of false-positive findings and to keep the overall significance level at 5%, a statistically significant P value should be <0.029 instead of 0.05.20

Role of the Funding Sources

The study was initiated, planned, and undertaken by the investigators. The sponsors provided economic help for pharmaceutical work, investigators’ meetings, monitoring during and after the study was closed, and secretarial and other administrative work. The local hospitals paid for the infliximab/placebo.

Results

Patient Population

Forty-five patients were randomized: 24 to infliximab and 21 to placebo. The first patient was included in July 2001 and the last in January 2004. Because of the slow enrollment, it was decided to perform the interim analysis earlier than specified in the protocol.

Population demographics and disease characteristics are summarized in Table 2. The patients were well distributed between groups regarding age, extent of UC, Seo index on day 0, randomization according to the fulminant colitis index or Seo index values, and endoscopic appearance. Variation was found for sex; 67% (16/24) were male in the infliximab group, and 38% (8/31) were male in the placebo group. Also, the distribution of earlier known/first attack of UC showed a difference; 22% (3/14) of first attacks of UC were in the infliximab group, compared with 43% (9/21) in the placebo group. Eight patients were treated with azathioprine at the time of inclusion: 5 were randomized to infliximab and 3 to placebo.

Outcome Measures

Outcome measures during the first 90 days after randomization are summarized in Table 3. Significantly more patients in the placebo group (14/21) than in the infliximab group (7/24) had a colectomy, as shown in Figure 1. This difference is statistically significant (P = 0.017), with an odds ratio (OR) of 4.9 (95% confidence interval [CI], 1.4–17) in favor of infliximab. In both groups, all operations were performed during the first month. The median time to operation after infusion of infliximab/placebo was 8 days (range, 2–22 days) in the infliximab group and 4 days (range, 1–13 days) in the placebo group. A Kaplan–Meier plot shows the time to operation in the 2 study groups (Figure 2). The cumulative proportion of patients not operated on after 90 days was 71% in the infliximab group and 33% in the placebo group (P = 0.0038; log-rank test). No patient died.

Patients with a positive fulminant colitis index had a colectomy more often in the placebo group (69%) than in the infliximab group (47%), a difference that was not statistically significant. However, in patients with somewhat less severe UC randomized according to the Seo index, infliximab seemed to have a pronounced effect, because none in the infliximab and 62.5% in the placebo group had a colectomy (P = 0.009).

Despite randomization, a skewed distribution was observed for earlier known UC and first attack of UC. More patients with a first attack had been randomized to the placebo group. Multivariate logistic regression analysis adjusted for an earlier known or first attack of UC still showed a statistically significant effect in favor of infliximab, with an OR of 3.6 (95% CI, 1.0–13.7). There were also more male patients in the infliximab than in the placebo group, and adjusting for sex gave an OR of

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**Table 3. Number of Patients With Colectomy During the First 90 Days After Infliximab/Placebo Treatment**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Infliximab (colectomy/total)</th>
<th>Placebo (colectomy/total)</th>
<th>P value (Fisher exact test; 2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>7/24 (29%)</td>
<td>14/21 (67%)</td>
<td>0.17</td>
</tr>
<tr>
<td>Inclusion based on fulminant colitis index</td>
<td>7/15 (47%)</td>
<td>9/13 (69%)</td>
<td>0.276</td>
</tr>
<tr>
<td>Seo index</td>
<td>0/9 (0%)</td>
<td>5/8 (62%)</td>
<td>0.009</td>
</tr>
<tr>
<td>Severe endoscopy</td>
<td>2/9 (22%)</td>
<td>4/6 (67%)</td>
<td>0.136</td>
</tr>
<tr>
<td>Moderately severe endoscopy</td>
<td>5/15 (33%)</td>
<td>10/15 (67%)</td>
<td>0.143</td>
</tr>
</tbody>
</table>

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**Figure 1.** Proportion of surgical/nonsurgical patients in the infliximab and placebo groups.
5.7 (95% CI, 1.4–22) in favor of infliximab. Of the patients treated with azathioprine at inclusion, 1 of 5 (20%) randomized to infliximab was operated on within 90 days, compared with 2 of 3 (67%) randomized to placebo.

The severity of inflammation at initial colonoscopy did not seem to markedly affect the outcome. Infliximab-treated patients in both endoscopy groups had a lower colectomy rate than placebo patients (Table 3). Surgery was as common in those with endoscopically severe findings as in patients with moderately severe endoscopic findings in the placebo-treated patients. A logistic regression analysis showed that the endoscopic appearance was not a confounder when the medical effect was evaluated (OR, 4.8; 95% CI, 1.3–17).

The clinical course in patients who avoided operation was similar in both groups, so they are presented together. At day 0, the Seo index in the combined group was 215 (SD, 30) and was 108 (SD, 20) at day 30 and 108 (SD, 36) at day 90. The difference both at day 30 and day 90 was highly significant compared with day 0 ($P < .001$).

Also, the endoscopic appearance was similar in the 2 groups. At 1 month after infusion, some patients refused a new colonoscopy. An endoscopy was, however, performed in 22 of the 24 patients who had not had a colectomy performed within 3 months of randomization. Nine had severe inflammation at inclusion. Of these, 3 were in remission, 4 had mild inflammation, and 2 had moderately severe inflammation. Of 15 patients with moderately severe inflammation at inclusion, 5 were in remission, 5 had mild inflammation, and 3 had moderately severe inflammation. After 3 months, 8 (6/15 infliximab patients and 2/6 placebo patients) of the evaluable patients were in complete clinical and endoscopic remission.

### Side Effects

No death occurred. The general side effects and the postoperative events are shown in detail in Table 4.

### Discussion

Infliximab has become an established treatment of CD. In UC, however, the results have been conflicting. Only 2 placebo-controlled studies have been performed. One included 43 patients with moderately severe steroid-resistant UC. No significant effect in favor of infliximab was noted. However, that study excluded patients who

### Table 4. General Side Effects and Postoperative Events

<table>
<thead>
<tr>
<th>Variable</th>
<th>Infliximab</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General side effects</strong></td>
<td>Central venous line septicemia; coagulase-negative staphylococci (n = 1)</td>
<td>Exanthema, probably trimetoprim/sulfamethoxazole (n = 2)</td>
</tr>
<tr>
<td></td>
<td>Arthralgia, knee joints (n = 2)</td>
<td>Epigastralgia, reflux, abnormal liver tests 50 days after infusion, probably azathioprine (n = 1)</td>
</tr>
<tr>
<td></td>
<td>Upper respiratory infection (n = 2)</td>
<td>Headache, 38.5°C 14 days after infusion, negative lumbar puncture (n = 1)</td>
</tr>
<tr>
<td></td>
<td>Pneumothorax when adopting central venous line (n = 1)</td>
<td>Ptsis, right eyelid, 32 days after infusion (n = 1)</td>
</tr>
<tr>
<td></td>
<td>Discrete exanthema, probably trimetoprim/sulphonamide (n = 1)</td>
<td>Dermal sensations during infusion (n = 1)</td>
</tr>
<tr>
<td></td>
<td>Pruritus during infusion (n = 1)</td>
<td>Arthralgia 90 days after infusion (n = 1)</td>
</tr>
<tr>
<td></td>
<td>Perspiration day 30 (n = 1)</td>
<td>Cardiac pacemaker 111 days after infusion (n = 1)</td>
</tr>
<tr>
<td><strong>Postoperative events</strong></td>
<td>Long-lasting bleeding from rectal stump (n = 1)</td>
<td>Reoperation due to septic complication—referable to rectal stump? (n = 3)</td>
</tr>
<tr>
<td></td>
<td>Ileus 48 days after infusion, probably mushroom related (n = 1)</td>
<td>High fever, CRP &gt;200 5 days after surgery, rectum flushed, normalization (n = 1)</td>
</tr>
<tr>
<td></td>
<td>Nausea, vomiting, abnormal liver tests, pneumonia (n = 1)</td>
<td>Urinary tract infection, fever, antibiotics (n = 1)</td>
</tr>
<tr>
<td></td>
<td>Reflux, oral candidiasis (n = 1)</td>
<td></td>
</tr>
</tbody>
</table>

CRP, C-reactive protein.
were at risk for an emergency colectomy. All patients in this study who did not respond quickly to IVIT faced this possibility. The other placebo-controlled study engaged such patients, but only 11 were randomized. Three received placebo, and all had a colectomy, whereas 4 of 8 patients who were treated with varying doses of infliximab underwent operation. This indicates a treatment effect. This is also supported by uncontrolled studies with similarities to the present study. In these 3 studies, a total of 32 patients were included, and 81% responded to treatment.

In this study, 29% (7/24) of the patients in the infliximab group had a colectomy, compared with 67% (14/21) in the placebo group, and this is a statistically significant difference ($P = 0.017$). The best effect was seen in patients randomized according to the Seo index. These patients usually had severe or moderately severe, but not fulminant, UC. If the patients were treated with azathioprine at the time of inclusion, this did not seem to affect the outcome. The endoscopic appearance had no influence on the treatment effect, in contrast to the studies by Carbonnel et al.

In Sweden and Denmark, CyA has not been generally adopted as a rescue therapy in acute severe UC because of the considerable risk of side effects and CyA-related mortality. Infliximab also carries a great risk of side effects and infliximab-related mortality. That is why such strict exclusion criteria were used in this study. We also used trimethoprim/sulfamethoxazole prophylaxis against opportunistic infections. In this study, there were no marked differences regarding general side effects between the infliximab and placebo groups.

One reason why several centers finally decided not to participate was a fear of postoperative complications in patients treated with infliximab. In fact, the major postoperative complications occurred in the placebo group. This confirms results from the study by Marchal et al. that infliximab has no effect on the postoperative course.

Our study was also used to prospectively evaluate the accuracy of the fulminant colitis index. That study was a retrospective analysis that, with a 75% sensitivity and specificity, could predict the risk of colectomy. Seventy-two percent of patients with an index value $\geq 8.0$ underwent operation. In the present study, 69% of the patients in the placebo group with a simple index of $\geq 8.0$ had an operation. Thus, this simple index could be used in clinical practice. A similar prospective study from Oxford showed with 85% accuracy that patients underwent operation if they had $>8$ bowel movements or 3–8 bowel movements and a CRP $>45$ mg/L on day 3. Thus, it seems likely that these clinical and laboratory characteristics indicate not only severe, but also fulminant, colitis imposing a very high emergency colectomy rate.

All patients have been followed up for a 6-month, but not a 12-month, observation period. Up until 6 months, no more patients underwent operation, but after that time, 2 in each group underwent operation. Thus, so far 9 of 24 infliximab patients and 16 of 21 placebo patients have had a colectomy.

Because this study was not a producer-sponsored trial, the drug was paid for by the local hospitals. For that reason, the infliximab dose varied between 4 and 5 mg/kg because we could not afford to use small amounts of an ampoule. The optimal dose can be decided only by future dose-finding studies.

This was an interim analysis. After consideration of the results, it was decided to terminate the study because of slow enrollment and for ethical reasons. This was accepted by the Swedish medical products agency.

In conclusion, we found infliximab to be a safe and effective rescue therapy in patients with acute attacks of severe to moderately severe UC.

References


