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Effect of steroids on patients with postoperative bowel anastomotic dysfunction

Luis H. Toledo-Pereyra, MD, PhD,* Ignacio Guzman, MD**, and Earl G. Yonehiro, MD, PhD**

Ten patients who developed anastomotic edema following large or small intestinal anastomosis had a rapid recovery after treatment with dexamethasone. The clinical and radiologic picture of adynamic ileus disappeared rapidly. There were no immediate or long-term (more than two years) complications or side effects associated with the use of dexamethasone. This preliminary report indicates that dexamethasone may be a beneficial agent in the control of anastomotic edema.

Following bowel resection, abdominal surgeons are often confronted with the problem of postoperative adynamic ileus due to intestinal anastomotic edema. The degree of intestinal edema varies according to the type of anastomosis, the suture material utilized, the degree of trauma during surgery, the site of resection and anastomosis, and the metabolic state of the patient.1 If the edema is significant, severe adynamic ileus or partial bowel obstruction may appear, delaying the patient's recovery. Efforts to reduce this anastomotic edema have been related mainly to improvement of surgical techniques. In this report we study the effect of steroids on patients with postoperative bowel anastomotic dysfunction.

Clinical material

Ten patients (Table I) were treated with dexamethasone after they developed severe adynamic ileus following intestinal anastomosis. We started using steroids in an effort to diminish the morbidity associated with postoperative bowel anastomotic obstruction. We were aware of the potential risks involved in this type of therapy. However, we always used the steroids for short periods of time and in very selective cases, i.e., those patients without infection.
We present a description of four illustrative cases.

**Case 1**
A 70-year-old white woman was admitted to the hospital on October 9, 1974 with a diagnosis of carcinoma of the cecum. After due preparation of the bowel, she underwent surgical resection of the lesion two days later by radical right hemicolectomy and ileo-transverse colostomy by a one-layer closed anastomosis. The procedure was carried out without incident. During the early postoperative period, the patient slowly improved with gradual return of bowel sounds. The abdomen was soft and nondistended. On the third day, with passage of flatus, the nasogastric suction was discontinued. The early morning hours of her fourth postoperative day were marked by severe nausea, vomiting, and abdominal distention. Emesis, distention, and nausea continued into the next day. A flat and upright film of the abdomen showed bowel distention with multiple fluid levels, gas in the left colon, and roentgen findings consistent with incomplete small bowel obstruction. On the sixth postoperative day, the abdomen was still distended, and the patient continued to be nauseated with an episode of emesis; so a course of intravenous dexamethasone was begun, 8 mg IV every 8h for two doses. The patient showed an excellent response to steroid therapy with complete resolution of symptoms within 8-12 hours with vomiting throughout the day. The next day a course of intravenous dexamethasone was initiated (12 mg IV every 8h for four doses and ten 8 mg every 8h for two doses). This treatment resulted in prompt resolution of the patient’s symptoms, and on the sixth day he was tolerating a full, weight-reduction diet. The patient became totally asymptomatic and was discharged on December 27, 1974, his eighth postoperative day.

**Case 2**
A 34-year-old white man was admitted to the hospital on December 17, 1974 with a diagnosis of regional enteritis with gross rectal bleeding. Over the next five days, the patient was transfused with five units of blood. Because of multiple bleeding ulcerations of the colon seen on colonoscopy, on December 26, 1974 she was operated on for a total colectomy and ileo-proctostomy with a one-layer closed anastomosis. The first three postoperative days passed uneventfully with gradual return of bowel function. On the fourth day, the patient had a small bowel movement, and the nasogastric tube was discontinued. On the fifth and sixth days, the patient continued to improve; she was able to tolerate a liquid diet and had several bowel movements. On the evening of the sixth day the patient had several soft stools and the nasogastric tube was removed. On the following morning, he had severe nausea and vomiting with abdominal distention. He vomited 500 cc of dark green bilious fluid and continued to be nauseated with vomiting throughout the day. The next day a course of intravenous dexamethasone was initiated (12 mg IV every 8h for four doses and ten 8 mg every 8h for two doses). This treatment resulted in prompt resolution of the patient’s symptoms, and on the sixth day he was tolerating a full, weight-reduction diet. The patient became totally asymptomatic and was discharged on December 27, 1974, his eighth postoperative day.

**Case 3**
A 32-year-old white man was admitted with a diagnosis of morbid obesity. He was 5 ft 10 in tall and weighed 399 lbs. On December 19, 1974, a jejunoileal bypass procedure was performed utilizing a one-layer closure. His initial postoperative course was uneventful with gradual return of bowel function. On his third postoperative day, the patient had several soft stools and the nasogastric tube was removed. On the following morning, he had severe nausea and vomiting with abdominal distention. He vomited 500 cc of dark green bilious fluid and continued to be nauseated with vomiting throughout the day. The next day a course of intravenous dexamethasone was initiated (12 mg IV every 8h for four doses and ten 8 mg every 8h for two doses). This treatment resulted in prompt resolution of the patient’s symptoms, and on the sixth day he was tolerating a full, weight-reduction diet. The patient became totally asymptomatic and was discharged on December 27, 1974, his eighth postoperative day.

**Case 4**
A 42-year-old white woman was admitted on December 20, 1974 with a diagnosis of regional enteritis with gross rectal bleeding. Over the next five days, the patient was transfused with five units of blood. Because of multiple bleeding ulcerations of the colon seen on colonoscopy, on December 26, 1974 she was operated on for a total colectomy and ileo-proctostomy with a one-layer closed anastomosis. The first three postoperative days passed uneventfully with gradual return of bowel function. On the fourth day, the patient had several soft stools and the nasogastric tube was discontinued. On the fifth and sixth days, the patient continued to improve; she was able to tolerate a liquid diet and had several bowel movements. On the evening of the sixth day the patient became nauseated and had emesis of 700 cc of dark green bilious material. On the morning of the seventh day, abdominal x-rays were consistent with a low-grade paralytic ileus, and a course of intravenous dexamethasone was begun with 8 mg IV every 8h for two doses and then 6 mg every 8h for two doses. The patient showed an excellent response to steroid therapy with complete resolution of symptoms with alleviation of her nausea,
Case 2 underwent a total colectomy with ileo-proctostomy. The flat abdominal film on the left obtained on the fifth postoperative day showed a marked paralytic ileus. In the right a repeat film taken 18 hours after dexamethasone shows complete radiological resolution. There was no residual paralytic ileus, the pattern of distribution of gas was normal, and no fluid levels or other abnormalities were noted.

vomiting, and distention over the next 24 hours. She continued to improve and was discharged on the ninth postoperative day.

**Discussion**

Dexamethasone was effective in diminishing the symptoms and improving the recovery of patients with postoperative anastomotic dysfunction. Several common characteristics were observed on these patients, such as the appearance of the adynamic or paralytic ileus during the first 6 postoperative days, one or two days following removal of the nasogastric tube. In these patients a complete clinical and radiological recovery was observed 8 to 12 hours after dexamethasone was given. The abdominal distention, nausea, and vomiting disappeared, bowel sounds reappeared, and the patients were able to resume an uncomplicated postoperative convalescence.

Significant morbidity and mortality have been associated with postoperative anastomotic obstruction. Early recognition and treatment of the postoperative intestinal obstruction have decreased the mortality due to this complication. In examining patients with early postoperative intestinal obstruction, it is important to differentiate between adynamic and mechanical obstruction. If mechanical obstruction is present, the distinction between simple and strangulating obstruction is basic. In this paper we considered only patients with the classical picture of adynamic ileus or partial small bowel obstruction due presumably to anastomotic edema. Other causes of adynamic or paralytic ileus immediately after surgery, such as hypokalemia, hyponatremia, hypochloremia, peritonitis, sepsis, nutritional deficiencies, and intestinal dyskinesia, were eliminated from this study. Whether the anastomotic edema was due to trauma to the bowel wall, excessive handling of the bowel,
TABLE I
Summary Of All Clinical Cases With Postoperative Bowel Anastomotic Dysfunction

<table>
<thead>
<tr>
<th></th>
<th>Sex</th>
<th>Age</th>
<th>Preoperative Diagnosis</th>
<th>Procedure</th>
<th>NG Tube Removed (Postop Day)</th>
<th>Paralytic Ileus (Postop Day)</th>
<th>Treatment</th>
<th>Day of Treatment</th>
<th>Response to Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>F</td>
<td>70</td>
<td>Carcinoma of Cecum</td>
<td>Right Hemicolecotomy with Ileo-transverse Colostomy</td>
<td>3rd</td>
<td>4th</td>
<td>Dexamethasone 8 mg q 8 hrs for 48 hrs</td>
<td>6th</td>
<td>Improved in 8 hrs with bowel movements</td>
</tr>
<tr>
<td>2.</td>
<td>M</td>
<td>34</td>
<td>Chronic Ulcerative Colitis</td>
<td>Total Colectomy with Ileo-proctostomy</td>
<td>3rd</td>
<td>4th</td>
<td>Dexamethasone 8 mg q 8 hrsx4 6 mg q 8 hrsx2</td>
<td>5th</td>
<td>Improved in 8 hrs with bowel movements</td>
</tr>
<tr>
<td>3.</td>
<td>M</td>
<td>32</td>
<td>Morbid Obesity</td>
<td>Jejunoileal Bypass</td>
<td>3rd</td>
<td>4th</td>
<td>Dexamethasone 12 mg q8hrsx4 8 mg q8hrsx2</td>
<td>5th</td>
<td>Improved in 12 hrs</td>
</tr>
<tr>
<td>4.</td>
<td>F</td>
<td>42</td>
<td>Regional Enteritis</td>
<td>Total Colectomy with Ileo-proctostomy</td>
<td>4th</td>
<td>6th</td>
<td>Dexamethasone 8 mg q8hrsx2 6 mg q8hrsx2</td>
<td>7th</td>
<td>Improved in 12 hrs</td>
</tr>
<tr>
<td>5.</td>
<td>M</td>
<td>38</td>
<td>Acquired megacolon (chronic idiopathic megacolon)</td>
<td>Total Colectomy with Ileo-proctostomy</td>
<td>24 hrs</td>
<td>4th</td>
<td>Decadron 10 mg IVq8 hrs x3 8 mg POq8hx3</td>
<td>5th</td>
<td>Improved in 24 hrs with bowel movements</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Return to admission with nonspecific abdominal pain</td>
<td>8th</td>
<td>Decadron 10 mg IVx3 8 mg POx3</td>
<td>10th</td>
<td>Improved in 12 hrs with bowel movements in 24 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>Age</td>
<td>Preoperative Diagnosis</td>
<td>Procedure</td>
<td>NG Tube Removed (Postop Day)</td>
<td>Paralytic Ileus (Postop Day)</td>
<td>Treatment</td>
<td>Day of Treatment</td>
<td>Response to Therapy</td>
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<tr>
<td>M</td>
<td>47</td>
<td>Adenocarcinoma of right colon</td>
<td>Right Hemicolecotmy</td>
<td>3rd</td>
<td>6th</td>
<td>Dexamethasone 8 mg IM q8hx2</td>
<td>6th</td>
<td>Improved with bowel movements in 24 hours</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6 mg q12hx2 IM</td>
<td></td>
<td>Feeling better in 12 hrs</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>55</td>
<td>Sigmoid Diverticulitis</td>
<td>Sigmoid Colectomy and coloproctostomy</td>
<td>6th</td>
<td>5th</td>
<td>Dexamethasone 8 mg IV q8hx3</td>
<td>5th</td>
<td>Better in 12 hrs</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6 mg IV q12hx2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>34</td>
<td>Morbid Obesity</td>
<td>Jejunoileal Bypass</td>
<td>2nd</td>
<td>Start 8th &amp; continue with vomiting to 12th</td>
<td>Dexamethasone 12 mg IV q8hx3</td>
<td>12th</td>
<td>12 hrs — Remarkable change; no vomit, continue with some nausea; 24 hrs no nausea</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>10 mg IV q8hx2</td>
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</tr>
<tr>
<td>M</td>
<td>74</td>
<td>Carcinoma of cecum</td>
<td>Right hemicolecotmy</td>
<td>2nd</td>
<td>5th</td>
<td>Dexamethasone 6 mg IV q8hx3</td>
<td>10th</td>
<td>12 hrs with bowel movements</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>9 mg IM q8hx2</td>
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<tr>
<td>F</td>
<td>32</td>
<td>Morbid Obesity</td>
<td>Jejunoileal Bypass</td>
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or other causes cannot be elucidated at the present time.

The rationale for the use of steroids to control the anastomotic edema appearing a few days after surgery was based on their general anti-inflammatory effect. The glucocorticoids exert a suppressive effect on inflammatory reactions regardless of the nature of the stimulus. The steroids interfere with the uptake and subsequent digestion of debris, diminish the influx of mononuclear phagocytes from peripheral blood to the site of inflammation, decrease the diapedesis, and depress lymphocytes. They also modify the macrophagic response, suppress the cellular response during inflammation, and interfere with the margination and sticking of leukocytes to vascular endothelium. On the other hand, the inhibition by corticosteroids of ingestion and digestion of microorganisms may permit the insidious, often occult, onset of infection.

Corticosteroids have been successfully used in the control of cerebral edema. In 1945 Prados and colleagues initially demonstrated that cerebral edema produced in the cat by exposure of brain tissue to air could be inhibited by adrenocorticotrophic hormone (ACTH) and cortisone. Several years later, Hume and Moore reported relief of signs and symptoms of intracranial pressure in a patient with metastatic tumor treated with ACTH. Grenell and Mendelsohn observed that hydrocortisone was more active than cortisone in the treatment of cerebral edema. In 1952 Kofman and associates demonstrated the beneficial effect of prednisone and prednisolone on 22 patients with intracranial metastatic tumors. In 1961 Galicich, French, and Melby observed good results in the use of dexamethasone in the treatment of cerebral edema associated with brain tumors. They also noted a benign postoperative course in patients receiving glucocorticoids. Significant improvement of the postoperative edema was observed in most of the patients.

In our limited experience, the glucocorticoids exerted significant improvement in our patients with anastomotic edema within 8 to 12 hours. Subjectively, the patients became asymptomatic. Objectively, the bowel sounds returned and abdominal distention disappeared with a significantly improved radiological picture. It is possible that besides the therapeutic effect of steroids on inflammation, most of these patients had a depleted glucocorticoid reserve because of the relative extensive operations, as well as prolonged postoperative recovery. It is also possible that steroids might be instrumental in stimulating bowel peristalsis. However, there is no experimental or clinical evidence to support such an action. Thus, several possible mechanisms could be involved in the beneficial action of steroids.

Experimental studies are being conducted in the laboratory to determine the effect of glucocorticoids on the edema of the intestinal anastomosis. In addition, the effect of steroids on intestinal peristalsis and other neuromuscular changes is being investigated on isolated canine small bowel preparations.

Two of our patients (Cases 2 and 4) had an inflammatory condition as the primary disease. It therefore is possible that corticosteroids decreased the swelling at the anastomotic site, which was the prime purpose for instituting their therapy in that patient, but, in addition, because of an underlying inflammatory bowel disease, they also contributed to the patient's improvement. One of these patients with chronic ulcerative colitis (Case 2) absolutely refused to have total procto-colectomy with permanent ileostomy. He did not want to have an ileostomy or face the possible complications of impotency which might have resulted from resection of the rectum. However, because of the extensiveness of the disease, the patient agreed to a total colectomy with ileo-proctostomy, and will be closely followed postoperatively by sequential proctoscopies.
Effect of steroids

In all of these patients, a disparity in the size of the bowel ends was observed; there was either a jejuno to ileum anastomosis or small to large bowel anastomosis. This might be a contributing factor in the development of anastomotic edema. Another patient who is not reported in this study had bilateral truncal vagotomy with antrectomy and gastrojejunoostomy. This patient had an "outlet obstruction" for several days, which also resolved with dexamethasone.

Rigid criteria should be established in the treatment of these patients with paralytic ileus or partial intestinal obstruction* due to anastomotic edema. All cases with postoperative paralytic ileus due to electrolyte disturbances, neuromuscular disorders, nutritional deficiencies, and sepsis should not be considered to be candidates for steroid therapy. In addition, when steroids are used, antibiotic therapy should be utilized concomitantly in individual cases.

Conclusion

In our group of patients there appeared to be a rapid resolution of anastomotic edema following treatment with dexamethasone because of the clinical response. Several hours after the glucocorticoid was given, the clinical and radiological picture of adynamic ileus significantly improved. There were no immediate or long-term (more than two years) complications or side effects associated with the use of dexamethasone at doses of 0.2 to 0.4 mg/kg/day intravenously given for two days at eight-hour intervals. The catabolic and anti-fibroblastic action of the glucocorticoids did not appear to interfere with wound healing. There were no wound infections, and acute gastrointestinal ulceration and/or bleeding did not occur. Although this is a preliminary report, dexamethasone appeared to be of significant benefit in the reduction of anastomotic edema.

References


