



Intra-abdominal venous thrombosis after colectomy in pediatric patients with chronic ulcerative colitis: Incidence, treatment, and outcomes

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ABSTRACT

Purpose: Children with chronic ulcerative colitis (CUC) are at increased risk for venous thromboembolism, especially after colectomy procedures. We aim to review our patients with CUC who underwent a colectomy and suffered intra-abdominal thrombosis; moreover we wanted to define thrombotic incidence and outcomes

Methods: In this IRB approved retrospective study, we reviewed our patients who underwent colectomy for CUC from January 1999 to December 2011 for development of intra-abdominal thrombosis.

Results: Of 366 patients with CUC who underwent colectomy, 15 (4%) were diagnosed with a venous thromboembolism. All patients presented with acute abdominal pain. The locations of thrombus formation varied: 13 (87%) developed thrombi in the portal vein, 4 (27%) in the splenic vein, 2 (13%) in the superior mesenteric vein, 1 (7%) in the hepatic vein, and 1 (7%) in the hepatic artery. The mean number of post-operative days at diagnosis of thrombus was 38.7 days (range 3–180 days). Fourteen patients (93%) underwent anticoagulation for treatment. The mean number of days of anticoagulant therapy until documented resolution of thrombus on imaging was 96.3 days (range 14–364 days). All thrombi resolved with therapy. There was no mortality during follow-up.

Conclusions: Four percent of our pediatric patients with chronic ulcerative colitis who underwent colectomy developed symptomatic intra-abdominal venous thromboembolism. 3 to 6 months of anticoagulant therapy is adequate treatment in almost all patients. Practitioners should have a high index of suspicion for intra-abdominal venous thrombus when these patients complain of abdominal pain postoperatively. Based on our experience, prophylactic anticoagulation should be strongly considered perioperatively in this population.

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Venous thromboembolisms (VTEs) are very rare in the general pediatric population with a reported incidence between 0.7 and 1.4 per 100,000 [1]. However, the clinical significance of such an event can be devastating with a mortality rate of approximately 2% [2]. Furthermore, over the past 15 years the frequency of VTE diagnosis has increased 3 to 10 fold in hospitalized children [3]. The vast majority of VTEs in children are found to be in conjunction with a coexisting medical condition [4]. Common coexisting conditions include: central venous catheters, sepsis, malignancy, and a history of recent surgery [2]. Data from a Canadian registry of children showed that cancer was the most commonly associated condition with the development of VTEs [5]. Other studies in children from the US showed that although VTEs were most commonly associated with cardiovascular disease, inflammatory bowel disease (IBD) puts patients at an increased risk of thromboembolism development [6–8].

Thromboembolic events in IBD patients were first described in 1936 [9]. The majority of these complications are related to deep vein thrombosis (DVT) or pulmonary emboli. Adult studies demonstrate that patients with IBD are at a 3 fold increased risk for systemic thromboembolic events when compared to the general population [10,11]. The incidence of thromboembolic events in children with IBD is between 1.3% and 2.3% [12,13]. The greatest risk in this population seems to be for lower extremity deep vein thrombosis and cerebrovascular thromboembolic events [13]. Although IBD is a hypercoagulable state, no consensus exists regarding the mechanism that predisposes IBD patients to thromboembolic events [8]. Thromboembolic events in children with IBD most commonly occur during active disease (82%), and specifically in children with chronic ulcerative colitis (CUC) (OR 3.7, 95% CI 1.8–7.6) [14].

While abdominal venous thrombi have been described in adult IBD populations after total colectomy with ileoanal anastomosis [15–19], this remains a rare postoperative complication in the pediatric population. Among a cohort of 70 IBD pediatric patients who had

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experienced some sort of thrombosis or thromboembolism, 11 (16%) had developed an abdominal venous thrombosis [13]. A recent case report documents portal vein thrombus development following proctocolectomy with pouch ileoanal anastomosis in 2 CUC patients [20]. Yet, the incidence of postoperative abdominal venous thrombosis in pediatric patients with CUC remains unknown.

In our IBD practice, we anecdotally noted a number of patients with CUC who have subsequently developed intra-abdominal thrombosis post-colectomy. These patients often present to clinic or the emergency department with abdominal pain following surgery. Furthermore, when we looked to the literature to help guide adequate therapy, we found very little data. Thus, we sought to review our CUC pediatric population who presented with an intra-abdominal thrombus after colectomy in order to better understand the incidence of this complication and the efficacy and duration of anticoagulation given to our patients.

1. Methods

We reviewed all patients, age 21 and younger, who underwent colectomy for CUC from January 1999 to December 2011. We included patients who developed intra-abdominal thrombosis following colectomy, including portal, mesenteric, splenic, or hepatic thrombus formation. Patients with Crohn's disease were not included in this study. Colectomy included all laparoscopic, open, subtotal, total abdominal, proctocolectomy, with or without reconstruction. Patients with other thromboembolic disease, such as lower extremity and upper extremity DVT, or internal jugular vein thrombosis, were not included in this analysis; however we did analyze if patients who had intra-abdominal thrombosis also had other complications such as DVT. Data were tabulated and summarized with frequencies and percentages. All analyses were performed using JMP version 9.0 (SAS Institute Inc). This study was approved by the Mayo Clinic institutional review board and is HIPPA compliant.

2. Results

We reviewed a total of 366 patients who underwent colectomy for CUC. Fifteen of these patients (incidence of 4%) were diagnosed with a portal, mesenteric, splenic, or hepatic venous thrombus. The mean age of this cohort ($n = 15$) was 17.9 years (range 14–21 years). Nine patients were female (60%). Eight patients (53%) underwent total colectomy, four underwent proctocolectomy (27%), and three underwent subtotal colectomies (20%). Three patients (20%) underwent open surgery, compared to 12 patients (80%) who underwent laparoscopic surgery.

All of the patients ($n = 15$) presented with acute onset of abdominal pain. The locations of thrombus formation varied among patients. Thirteen (87%) developed thrombi in the portal vein, 4 (27%) in the splenic vein, 2 (13%) in the superior mesenteric vein, 1 (7%) in the hepatic vein, and 1 (7%) in the hepatic artery. None of these 15 patients experienced lower or upper extremity DVT or internal jugular vein thrombosis. All of these mesenteric thrombi were noted on computer tomography scan except for one patient who was diagnosed with ultrasound (Fig. 1). The mean number of post-operative days at the time of diagnosis of thrombus was 38.7 days (range 3–180 days). One patient developed a thrombus three days before his scheduled colectomy diagnosed by pre-operative ultrasound, but underwent emergent colectomy. None of the patients in our cohort had any known underlying hypercoagulable state, besides the diagnosis of CUC and undergoing a surgical procedure. We did not find a significant relationship between risk of thrombus formation and age, gender, or other patient factors.

Fourteen of 15 patients (93%) underwent anticoagulation for treatment. Ten patients were initially anticoagulated with low-molecular weight heparin and subsequently sent home on warfarin.

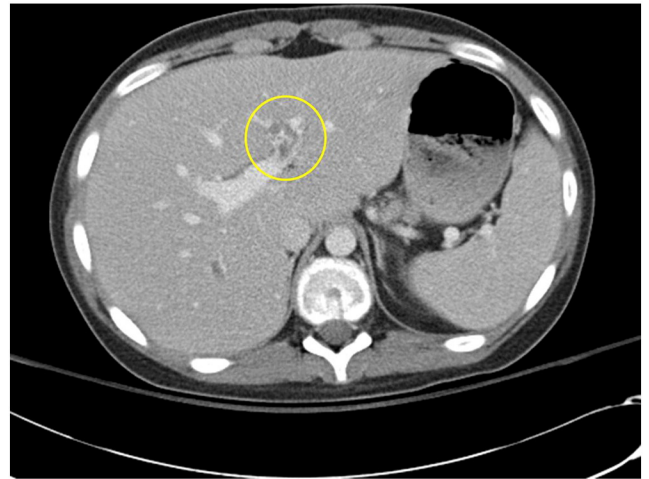


Fig. 1. Computer tomography image of hepatic venous thrombosis in a patient following total colectomy.

Others were treated with low-molecular-weight heparin only (dalteparin sodium) ($n = 3$). One patient was treated with aspirin only. The remaining patient's splenic vein thrombi dissolved, based on follow up imaging, without anticoagulation. The shortest duration of therapy (when given) was 7 weeks with a mean duration of 16 weeks, median duration 12.7 weeks; and 2 patients were put on therapy indefinitely.

The mean number of days until documented resolution on imaging was 96.3 days (range 14–364 days). All thrombi in these patients did resolve based upon subsequent imaging. One patient developed acute pancreatitis associated with her splenic vein thrombus. There was no mortality during follow-up (Table 1).

3. Discussion

Intra-abdominal thrombosis is an uncommon, but potentially serious complication in pediatric patients who undergo any type of colectomy for CUC. These patients represent a high risk self-selected population since only patients with surgical indications undergo colectomy. Many of those patients are on high doses of medication such as steroids, have lost significant amounts of blood, and/or have

Table 1
Characteristics of CUC patients who presented with an intra-abdominal thrombus following colectomy.

| Characteristic | No. (%) |
|--|--------------|
| Demographics | |
| Female | 9 (60) |
| Male | 6 (40) |
| Mean age (range) | 17.9 (14–21) |
| Mean postoperative days at diagnosis (range) | 38.7 (3–180) |
| Operation | |
| Total colectomy | 8 (53) |
| Proctocolectomy | 4 (27) |
| Subtotal colectomy | 3 (20) |
| Location of thrombus | |
| Portal vein | 13 (87) |
| Splenic vein | 4 (27) |
| Superior mesenteric vein | 2 (13) |
| Hepatic vein | 1 (7) |
| Hepatic artery | 1 (7) |
| Anticoagulation | |
| LMWH ^a and Coumadin | 10 (66) |
| LMWH ^a only | 3 (20) |
| Aspirin only | 1 (7) |
| None | 1 (7) |

^a LMWH: low molecular weight heparin.

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