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Clinical presentation, management, follow-up, and outcomes of isolated celiac and superior mesenteric artery dissections

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ABSTRACT

Objective: Isolated visceral artery dissections are rare entities with no current consensus guidelines for treatment and follow-up. This study aims to evaluate the presentation, management, outcomes, and follow-up practices for patients with isolated visceral artery dissections and to compare those with and without symptoms.

Methods: In this retrospective analysis, we identified all patients with isolated celiac artery and/or isolated superior mesenteric artery dissections at a single institution between September 2006 and December 2014. Patients with concomitant aortic dissections were excluded. Cases were stratified by symptom status. Presentation, anatomic findings, treatment, outcomes, and follow-up imaging were then compared between symptomatic and asymptomatic patients.

Results: We identified 25 patients including 15 with symptoms and 10 without. There were no differences in patient comorbidities; however, symptomatic patients more frequently presented with thrombus (n = 10; 67% vs n = 1; 10%; $P = .01$) and inflammation (n = 8; 53% vs n = 1; 10%; $P = .04$), and trended toward increased stenosis (n = 12; 80% vs n = 4; 40%; $P = .09$) compared with asymptomatic patients. All asymptomatic patients were treated with observation alone with vessel diameter enlargement noted in 33% (n = 2) of patients on follow-up imaging. Among symptomatic patients, standard treatment included a short course of anticoagulation (mean, 4.5 months) with lifelong antiplatelet therapy. Three patients underwent operative intervention for persistent or worsening symptoms, two during the index admission and one 10 months after presentation for chronic abdominal pain. Approximately 70% (n = 17) of patients in each group had follow-up imaging (computed tomography angiography: n = 14; 56%; magnetic resonance angiography: n = 4; 16%; ultrasound: n = 13; 52%). Among patients treated nonoperatively, no patients complained of symptoms at follow-up, and 50% of those with inflammation on initial imaging had resolution. Twenty-five percent (n = 4) of patients had an increase in vessel size; however, all vessels remained less than 2 cm in maximal diameter. There were no ruptures or related deaths in either group.

Conclusions: Among patients with visceral artery dissection, no ruptures occurred but diameter enlargement was documented. This disease progression suggests that routine surveillance may be appropriate; however, transitioning early to ultrasound imaging should be considered to decrease radiation, contrast, and associated costs. (J Vasc Surg 2016;■:1-8.)

Isolated dissection of a visceral artery occurs infrequently; however, improvements in imaging technology and increased use have led to increased identification.[1] Isolated visceral artery dissection may be found incidentally among patients without symptoms or may be identified in conjunction with abdominal pain, back pain, nausea, or vomiting.[2] No current consensus guidelines exist, and treatment varies by surgeon preference, anatomic characteristics, and symptomatology, and may include anticoagulation, antiplatelet, and antihypertensive medications, as well as operative intervention.[3-7] In addition, few studies have compared the natural history, treatment trends, and outcomes among symptomatic and asymptomatic patients.

Given the infrequency of this diagnosis, no large multicenter studies have been published. Furthermore, the majority of current literature consists of case reports and descriptive studies from populations outside of North America. Therefore, this study aims to evaluate the clinical presentation, imaging, treatment, and natural history of isolated visceral artery dissection among both symptomatic and asymptomatic patients in the United States.

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METHODS

Patient identification. A retrospective review of all patients diagnosed with isolated visceral artery dissections at Beth Israel Deaconess Medical Center between September 2006 and December 2014 was performed. Initially, 210 patients were identified using the *International classification of Diseases, Ninth Revision* code for other artery dissection (433.29). Chart review was performed including a review of all imaging studies to identify patients with isolated celiac artery dissections and/or isolated superior mesenteric artery (SMA) dissections. Patients with concomitant aortic dissection or dissection in an artery other than the celiac artery or SMA were excluded (n = 185). Patients were then stratified by symptom status.

Variables. Patient demographics and comorbidities were identified. A symptomatic dissection was defined by presence of abdominal pain, back pain, nausea, or vomiting that was not attributable to other causes. All imaging performed and the indications for each initial imaging study were documented. The frequency and modality of follow-up imaging was at the discretion of the treating physician and included computed tomography angiography (CTA), magnetic resonance angiography (MRA), and duplex ultrasound. Initial anatomic characteristics were obtained from the first CTA imaging study performed and included vessel affected, length of dissection, extension into distal branches, and maximal diameter of the dissected vessel. Vessel stenosis was documented if it exceeded 70%. Thrombus, stenosis, and inflammation were also documented by the attending radiologist and/or attending vascular surgeon. Additional measurements for both initial and follow-up imaging, if not formally dictated in the radiology report, were completed by senior general surgery residents who were blinded to the patient symptom status and before other imaging studies. An aneurysm of a visceral artery dissection was defined as 1.5 times normal diameter (larger than 1.2 cm for the celiac artery and larger than 1.1 cm for the SMA); and a diameter of 2.0 cm or greater was considered an indication for operative repair.[8,9] A change in vessel size on follow-up imaging was defined as a 2.0-mm increase or decrease in diameter on CTA.

Operative intervention was defined as acute (initial hospitalization) or late (after index discharge). Medical management was defined as any new antiplatelet, new anticoagulation, or new or increased antihypertensive medications. Among patients treated with a new medication, the mean duration of anticoagulation and the proportion treated with lifelong antiplatelet agent for were also documented.

Outcomes assessed included 30-day and 1-year mortality, and length of stay. Mortality data was verified from the Social Security Death Index. All subsequent clinic visits, imaging, and readmissions were reviewed for each patient.

Statistical analyses. All statistical analyses were performed using SPSS statistical software (v 20; IBM Corp, Armonk, NY). Binary variables were recorded as a number and percentage. Continuous variables were assessed as mean ± standard deviation or median with interquartile range as appropriate and analysis was completed using Fisher exact, χ^2, *t*-test, and Mann-Whitney test. A *P* value of <.05 was considered significant. The Beth Israel Deaconess Medical Center Institutional Review Board approved this study, and informed consent was waived because of the retrospective nature of this study.

RESULTS

Baseline characteristics. Twenty-five patients with isolated visceral artery dissections were identified: 15 (60%) symptomatic and 10 (40%) asymptomatic. The majority of all patients were male (symptomatic: n = 12; 80% vs asymptomatic: n = 6; 60%; *P* = .38). Patients with symptomatic dissections were younger (50 vs 66 years; *P* < .01); however, other comorbidities did not differ. Importantly, there were no patients with a known connective tissue disorder. One symptomatic patient reported cocaine use immediately prior to the development of abdominal pain. Three patients had a history of a trauma including two patients with a history of blunt trauma (one at the time of presentation and one 4 years post-trauma). One patient had an iatrogenic traumatic dissection, which occurred during chemoembolization for intra-abdominal cancer. Only the acute blunt trauma patient was symptomatic; however, that patient was noted to have concomitant intra-abdominal injuries making it difficult to decipher the true cause of his abdominal pain (Table I).

Presentation. All symptomatic patients presented with abdominal pain. Other concurrent symptoms included back pain (n = 5; 33%), nausea (n = 2; 13%), and vomiting (n = 1; 7%). Symptomatic patients were more commonly treated as inpatients (n = 14; 93% vs n = 5; 50%; *P* = .02) and transferred from an outside hospital (n = 9; 60% vs n = 1; 10%; *P* = .02). Initial imaging modalities did not differ and the majority of dissections were identified on CTA (symptomatic: n = 15; 100% vs asymptomatic: n = 8; 80%). Two asymptomatic patients had incidental findings on other imaging studies, an MRA for disseminated cancer and an angiogram in a patient who had a dissection caused by chemoembolization (Table II). For all symptomatic patients, imaging was performed to evaluate abdominal pain. Indications for imaging varied among asymptomatic patients and included surveillance for other diseases (n = 5; 50%), work-up of cardiopulmonary conditions (n = 2; 20%), evaluation of a cecal volvulus (n = 1; 10%), diarrhea (n = 1; 10%), and sepsis (n = 1; 10%) (Table III).