Efficacy and Clinical Outcomes of Transcatheter Arterial Embolization for Gastrointestinal Bleeding from Gastrointestinal Stromal Tumor

Hyun Jung Koo, MD, PhD, Ji Hoon Shin, MD, PhD, Sooyoung Shin, MD, Hyun-Ki Yoon, MD, PhD, Gi-Young Ko, MD, PhD, and Dong Il Gwon, MD

ABSTRACT

Purpose: To evaluate the efficacy and clinical outcomes of transcatheter arterial embolization (TAE) for gastrointestinal (GI) bleeding from gastrointestinal stromal tumor (GIST).

Materials and Methods: TAE was performed in 20 referred patients (male:female = 13:7; median age, 56.3 y) for GI bleeding from GISTs. The locations of GISTs were assessed using contrast-enhanced computed tomography (CT) and catheter angiography. The technical and clinical success of TAE and clinical outcomes including procedure-related complications, recurrent bleeding, 30-day and overall mortality, and cumulative survival were evaluated.

Results: The sites of GIST-related bleeding or tumor staining were the jejunum (n = 9), stomach (n = 5), ileum (n = 3), duodenum (n = 2), and jejunum and colon (n = 1). Angiography showed bleeding from GIST in 5 patients, and tumor staining was noted in only 15 patients. TAE was performed for patients with and without contrast medium extravasation on angiography. Technical and clinical success rates of TAE were 95% (19 of 20 patients) and 90% (18 of 20 patients), respectively. Recurrent bleeding was noted in 1 patient. There were no procedure-related complications. In 15 patients, surgical resection of the tumors was performed after TAE. The 30-day and overall mortality rates were 10% (2 of 20 patients) and 30% (6 of 20 patients), respectively.

Conclusions: TAE is a safe and effective method for controlling GI bleeding from the GIST.

ABBREVIATIONS

GI = gastrointestinal, GIST = gastrointestinal stromal tumor, INR = international normalized ratio, NBCA = *N*-butyl cyanoacrylate, pRBCs = packed red blood cells, PVA = polyvinyl alcohol, TAE = transcatheter arterial embolization

Gastrointestinal stromal tumor (GIST) is a tumor of mesenchymal origin in the gastrointestinal (GI) tract. Although it is the most common mesenchymal tumor of the GI tract, GIST accounts for only 2% of all GI tumors (1–4). The tumors are generally defined as spindled, epithelioid, mesenchymal tumors with overt mutations in the v-kit Hardy-Zuckerman 4 feline sarcoma viral oncogene homolog (*KIT*) or platelet-derived growth factor receptor alpha gene; the rate of *KIT* positivity has been reported to be 95% and 98% in the stomach and small bowel, respectively (5). Although GIST can arise from any organ in the GI tract, the stomach and small bowel are most commonly involved (6,7). The primary treatment option for localized GIST is complete surgical resection. For patients with advanced disease or unresectable tumor, treatment with imatinib is recommended with or without surgery (8–10).

GI bleeding from the GIST is rare and can manifest as asymptomatic occult bleeding. It is often found incidentally during imaging or endoscopic workups performed for other reasons, and the definitive diagnosis is made by pathology. However, life-threatening bleeding rarely occurs (11–13). If endoscopic intervention, including

From the Department of Radiology and Research Institute of Radiology (H.J.K., J.H.S., H.-K.Y., G.-Y.K., D.I.G.), Asan Medical Center, University of Ulsan College of Medicine, Olymphic-ro 43 gil 88, Songpa-Gu, Seoul 138-736, Korea; and Department of Diagnostic Radiology (S.S.), University of Texas MD Anderson Cancer Center, Houston, Texas. Received January 26, 2015; final revision received May 29, 2015; accepted June 1, 2015. Address correspondence to J.H.S.; E-mail: jhshin@amc.seoul.kr

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clipping, electrocoagulation, or epinephrine injection, fails to control the bleeding, emergency surgery can be performed, although it has significant morbidity or mortality (14). Embolization could be an alternative option for managing bleeding, especially in elderly patients who are at risk for postoperative morbidity because of their advanced age or generally poor health condition. There have been only a few previous case reports regarding the use of transcatheter arterial embolization (TAE) for GI bleeding from GIST (15–17). The purpose of the present study was to evaluate the efficacy and clinical outcomes of TAE for GI bleeding from GIST and show its usefulness as a palliative or preoperative management method.

MATERIALS AND METHODS

Patient Characteristics and Study Design

This study was approved by the hospital institutional review board; informed consent for data usage was waived because of the retrospective nature of the study. Informed consent from any patient who was treated with emergent TAE was obtained from either the patient or a family member before the procedure. Data used for this study were from electronic medical records. From January 2007 to December 2012, GIST was diagnosed in 2,078 patients, and among them, 20 (1.2%) patients (male:female = 13:7; mean age, 56.3 y) underwent TAE for GI bleeding from pathologically proven GIST. Pathologic diagnosis was made in 12 patients before embolization, and diagnosis in the remaining 8 patients was made following operations after embolization. The patient characteristics are noted in the **Table**.

GI bleeding was detected as ongoing hematemesis, melena, or hematochezia. The cause of GI bleeding was diagnosed as GIST-related bleeding based on a review of the patient's previous medical history and computed tomography (CT), endoscopic, or angiographic findings. Systolic and diastolic blood pressure; heart rate; hemoglobin; and coagulation profile including platelet count, prothrombin time, activated partial thromboplastin time, and international normalized ratio (INR) were also measured at the time of the patient's initial presentation.

Table. Characteristics of Study Patients (N = 20)

Clinical Factors	
Age (y), median (IQR)	56.3 (50–64)
Male:female (n)	13:7
Systolic/diastolic blood pressure (mm Hg), median (IQR)	123 (114–140)/68 (63–84)
Heart rate (beats/min), median (IQR)	87 (82–97)
Hemoglobin (g/dL), median (IQR)	7.7 (6.9–9.2)
Platelets (μL), median (IQR)	163,000 (101,500–216,000)
PT (s), median (IQR)	12.6 (11.5–13.2)
aPTT (s), median (IQR)	27.2 (25.4–32.8)
INR, median (IQR)	1.1 (1.1–1.2)
Coagulopathy (n)	1 (5%)
Multiplicity (n)	
Single lesion	12
Multiple lesions	8
History of endoscopic hemostatic attempt (n)	
Yes	14 (60%)
No	6 (40%)
Interval between symptom and TAE (d), median (IQR)	0 (0–5)
Interval between CT scans and TAE (d), median (IQR)	3 (1–12)
Interval between TAE and operation, median (IQR)	6 (2–7)
pRBC units before angiography (n)	4 (range, 0–24)
pRBC units after angiography (n)	2 (range, 0–14)
Treatment methods (n)	
Operation after TAE	11
Operation and medical treatment including imatinib after TAE	3
Medical treatment including imatinib after TAE	4
Secondary TAE	1
Secondary operation	1
Follow-up (y)	2.2 (0.6–3.0)

Note–IQR values are from the 25th to 75th percentile.
aPTT = activated partial thromboplastin time, INR = international normalized ratio, IQR = interquartile range, pRBC = packed red blood cell, PT = prothrombin time, TAE = transcatheter arterial embolization.