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Original article

Real clinical management of patients with isolated superior mesenteric artery dissection in Japan

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ABSTRACT

Background: Due to the rarity of this condition, clinical treatment and outcomes in isolated superior mesenteric artery dissection (ISMAD) patients remain unknown. The primary aim of this retrospective multicenter study was to elucidate the treatment strategies and in-hospital outcomes for ISMAD patients by using administrative data.

Methods: We retrospectively analyzed patients that were primarily diagnosed with ISMAD using the Diagnosis Procedure Combination data collected at 141 hospitals in Japan in 2015. Patients with comorbidities that included "aneurysm" were excluded.

Results: A total of 221 ISMAD without aneurysm patients (male: 90.5%; mean age: 52.5 ± 10.1 years) were enrolled, and 95 (67.4%) of these encountered just one ISMAD case per year. We found only one (0.5%) in-hospital death and length of stay for ISMAD patients was 13.2 ± 9.1 days. One-third of patients received antiplatelet therapy (32.1%) and anticoagulation therapies, such as heparin (38.9%) and warfarin (10.0%). A total of 146 (66.1%) patients received antihypertensive treatment (either orally or via an intravenous route) during hospitalization. Twelve (5.4%) patients underwent surgical procedures during hospitalization as follows: 4 (33.3%) patients underwent bypass surgery, 3 (25.0%) patients underwent exploratory laparotomies, 2 (16.7%) patients underwent bowel resection, 1 (8.3%) patient underwent a thrombectomy, and 2 (16.7%) patients underwent surgical angioplasties.

Conclusions: We found that conservative therapy for ISMAD patients without aneurysm is safe and is also associated with a low rate of surgical intervention in clinical practice.

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Introduction

While isolated superior mesenteric artery dissection (ISMAD) is considered a rare condition, recent progress in imaging modalities such as computed tomographic (CT) angiography imaging has improved diagnosis [1]. Despite an increasing number of reports worldwide, the question of how to treat ISMAD largely depends on individual physicians. Although there are many literature reviews and clinical practice reports for ISMAD, many of them describe a sample size of just 20 in each single study [1–3]. Actual clinical treatment strategies and outcomes in ISMAD patients remain unknown. Here we present

a retrospective multicenter study that aimed to show the real clinical practice for ISMAD patients.

Methods

Study design and data sources

This was a retrospective study using Diagnosis Procedure Combination (DPC) data collected between January 2015 and December 2015. These data were collected from 141 Japanese hospitals that had agreed to its secondary usage. The requirement for informed consent was waived as the data were anonymized. The DPC data included the following: patient age and sex; main diagnoses and comorbidities, recorded with both International Classification of Diseases (Tenth Revision) (ICD-10) codes and text data written in Japanese; New York Heart Association (NYHA) functional class at admission; drugs and devices; diagnostic and

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therapeutic procedures such as surgical procedures coded using the Japanese claims classification (K-code with Japanese text); admission and discharge dates; discharge status; and unique hospital identifiers.

Patient selection and definition

We selected patients with a primary diagnosis of superior mesenteric artery dissection between January 2015, and December 2015, as per the Japanese text data. We excluded those patients whose comorbidities including “aneurysm” in the Japanese text, as an aneurysm itself could be an indication for surgery and we were unable to appropriately differentiate between aneurysms with mural thrombosis and dissection with a thrombosed false lumen [4]. Baseline characteristics were compiled based on patient age and sex, the Charlson Comorbidity Index (CCI), and comorbidities (including atrial fibrillation and flutter, cerebrovascular disease, chronic pulmonary disease, chronic liver disease, renal disease, malignancy, diabetes, and hypertension). We defined the patients' comorbidities by using ICD-10 and CCI definitions (Supplement Table 1) [5,6]. Detailed surgical data during hospitalization were obtained via the K-code with Japanese text. The study protocol conformed to the ethical guidelines of the 1975 Declaration of Helsinki as reflected in a priori approval by the institutional review board of The St. Luke's International University.

Supplementary Table 1 related to this article can be found, in the online version, at [doi:10.1016/j.jjcc.2017.08.006](https://doi.org/10.1016/j.jjcc.2017.08.006).

Statistical analysis

Categorical variables are presented as numbers and proportions while continuous variables are presented as the mean \pm standard deviation (SD) or the median with the interquartile range (IQR). All statistical analyses were performed using “R” software (Version 3.2.5, R Foundation, Vienna, Austria).

Results

Baseline patient characteristics and in-hospital outcomes

A total of 221 ISMAD patients were enrolled in this study (Table 1). The majority of patients were male (90.5%) and three-fourths were not associated with any comorbidities as calculated by CCI. Of 141 hospitals, the annual number of ISMAD cases per hospital was as follows: 1 case (67.4%), 2 cases (16.3%), 3 cases (11.3%), and 4 cases or more (5.0%) (Table 2). We noted just one (0.5%) in-hospital death and the length of stay of these patients was 13.2 ± 9.1 days. Total cost of hospitalization was $612,854.5 \pm 505,399.8$ yen (median, 508,546 yen; IQR: 338,080–745,170).

Imaging modality and drug usage

CT and Doppler ultrasound were performed on 209 (94.6%) and 71 (32.1%) patients, respectively (Table 3). One-third of these patients received antiplatelet (32.1%) and anticoagulation therapy [such as heparin (38.9%) and warfarin (10.0%)]. Six patients (2.7%) received both antiplatelet and anticoagulation therapy. A total of 146 (66.1%) patients received antihypertensive treatment (either orally or via an intravenous route) during hospitalization.

Surgical procedures

Twelve (5.4%) patients underwent surgical procedures during hospitalization as follows (Table 4): 4 (33.3%) patients underwent bypass surgery, 3 (25.0%) patients underwent an exploratory

Table 1
Baseline characteristics.

Patients	n = 221
Male, n (%)	200 (90.5)
Age, year	52.5 \pm 10.1
Height, cm	158.0 \pm 41.8
Weight, kg	65.2 \pm 18.9
Comorbidities	
Acute myocardial infarction, n (%)	0 (0)
Congestive heart failure, n (%)	11 (5)
Peripheral vascular disease, n (%)	2 (0.9)
Cerebral vascular accident, n (%)	4 (1.8)
Dementia, n (%)	0 (0)
Pulmonary disease, n (%)	6 (2.7)
Connective tissue disorder, n (%)	0 (0)
Peptic ulcer, n (%)	29 (13.1)
Liver disease, n (%)	1 (0.5)
Diabetes, n (%)	9 (4.1)
Diabetes complications, n (%)	0 (0)
Paraplegia, n (%)	0 (0)
Renal disease, n (%)	2 (0.9)
Cancer, n (%)	8 (3.6)
Metastatic cancer, n (%)	1 (0.5)
Severe liver disease, n (%)	0 (0)
HIV, n (%)	0 (0)
Atrial fibrillation/flutter, n (%)	3 (1.4)
Rheumatic disease, n (%)	0 (0)
Hypertension, n (%)	134 (60.6)
CCI score, n (%)	
0	156 (70.6)
1	51 (23.1)
2	10 (4.5)
≥ 3	4 (1.8)

HIV, human immunodeficiency virus; CCI, Charlson Comorbidity Index.

Table 2
Annual case volume (n = 141 hospitals).

Annual case volume per year	Hospital number
1	95 (67.4)
2	23 (16.3)
3	16 (11.3)
4	4 (2.8)
5	2 (1.4)
6	1 (0.7)

Table 3
Imaging modalities and drug usage during hospitalization.

Imaging modalities, n (%)	
Computed tomography, n (%)	209 (94.6)
Doppler ultrasound, n (%)	71 (32.1)
Prescriptions, n (%)	
ACE-I/ARB	72 (32.6)
Beta blocker	54 (24.4)
Ca blocker	4 (1.8)
Alpha blocker	5 (2.3)
Nitroglycerin	0 (0)
Aldosterone blocker	1 (0.5)
Oral opioid	1 (0.5)
Antiplatelet therapy	65 (29.4)
Anticoagulation therapy	16 (7.2)
Antiplatelet and anticoagulation	6 (2.7)
Intravenous drugs, n (%)	
Nitroglycerin	5 (2.3)
Beta blocker	9 (4.1)
Ca blocker	115 (52)
Thrombolytic therapy	3 (1.4)
Intravenous heparin	86 (38.9)
Opioid	29 (13.1)

ACE-I, angiotensin-converting enzyme inhibitor; ARB, angiotensin II receptor blocker.

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