Journal of the Formosan Medical Association (2017) xx, 1–6

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.jfma-online.com

Original Article

Small bowel tumors: A digestive endoscopy society of Taiwan (DEST) multicenter enteroscopy-based epidemiologic study

Chen-Shuan Chung [a,b], Chi-Ming Tai [c], Tien-Yu Huang [d], Chen-Wang Chang [e,f], Kuan-Chih Chen [a], Chao-Ming Tseng [g], Horng-Yuan Wang [e,f], Cheng-Hsin Chu [e,f], Jiann-Ming Wu [h], Yun Chen [h], Hsiu-Po Wang [i,*]

[a] *Division of Gastroenterology and Hepatology, Department of Internal Medicine, Far Eastern Memorial Hospital, Banqiao District, New Taipei City, Taiwan*
[b] *College of Medicine, Fu Jen Catholic University, New Taipei City, Taiwan*
[c] *Division of Gastroenterology and Hepatology, Department of Internal Medicine, E-Da Hospital, I-Shou University, Kaohsiung City, Taiwan*
[d] *Division of Gastroenterology, Department of Internal Medicine, Tri-Service General Hospital, National Defense Medical Center, Taipei, Taiwan*
[e] *Division of Gastroenterology, Department of Internal Medicine, Mackay Memorial Hospital, Taipei, Taiwan*
[f] *MacKay Junior College of Medicine, Nursing and Management, Taipei, Taiwan*
[g] *Division of Gastroenterology and Hepatology, Department of Internal Medicine, E-Da Cancer Hospital, I-Shou University, Kaohsiung City, Taiwan*
[h] *Department of Surgery, Far Eastern Memorial Hospital, Banqiao District, New Taipei City, Taiwan*
[i] *National Taiwan University Hospital and National Taiwan University College of Medicine, Taipei, Taiwan*

Received 23 December 2016; received in revised form 6 August 2017; accepted 4 September 2017

KEYWORDS
Small intestine;
Small bowel;
Tumors;
Enteroscopy

Background/Purpose: Small bowel (SB) accounts for the majority of gastrointestinal tract but its tumors are rare and always overlooked. In this study, we aimed to evaluate the epidemiology of SB tumors.
Methods: This multicenter retrospective study utilized endoscopy database from 2006/11 to 2016/07. Baseline demographic characteristics, clinical, radiologic and endoscopic findings were collected.
Results: Totally 103 (34 benign, 69 malignant lesions) patients with SB tumors in 1070 enteroscopic examinations were enrolled. There were male preponderance (56.3% males, 43.7%

* Corresponding author. Department of Internal Medicine, National Taiwan University Hospital, National Taiwan University, College of Medicine, No. 7, Chung-Shan South Road, Taipei, Taiwan. Fax: +886 2 23947899.
E-mail address: wanghp@ntu.edu.tw (H.-P. Wang).

http://dx.doi.org/10.1016/j.jfma.2017.09.003

Please cite this article in press as: Chung C-S, et al., Small bowel tumors: A digestive endoscopy society of Taiwan (DEST) multicenter enteroscopy-based epidemiologic study, Journal of the Formosan Medical Association (2017), http://dx.doi.org/10.1016/j.jfma.2017.09.003

females), both in benign (52.9%, 49.1%) and malignant (58.0%, 42.0%) lesions, except for subtype gastrointestinal stromal tumors (GISTs) (31.6%, 68.4%). The age (mean ± SD) at diagnosis in malignant SB tumors (62.2 ± 15.6) was older than those with benign tumors (50.7 ± 21.4) ($p < 0.01$). Bleeding (43.7%), abdominal pain (40.8%) and ileus (10.7%) were the most common clinical presentations. Hamartoma (32.4%) and adenoma (14.7%) were the most common benign histology. Four major malignant histological subtypes were lymphomas (29.0%), GISTs (27.5%), adenocarcinomas (26.1%) and metastatic cancers (14.5%). SB adenocarcinoma patients (>60-year-old, 77.8%) were older than lymphomas (60%) and GISTs (50%). Proximally location rates of lymphomas, GISTs, adenocarcinomas were 25.0% (5/20), 84.2% (16/19), and 88.9% (16/18), respectively.

Conclusions: This endoscopy-based study revealed the most common histology of benign SB tumors were hamartoma and adenoma, and malignant ones were lymphomas, GISTs, adenocarcinomas and metastatic cancers. Most of them were male gender, except for GISTs, and with proximal location, except for lymphomas. Further large-scale investigation efforts are warranted to elucidate the epidemiology of SB tumors.

Introduction

Small bowel (SB) presents the majority of the gastrointestinal (GI) tract length and absorptive surface; however, malignancies of SB account for only 1–3% of all GI tract malignancies.[1–5] The data from Surveillance, Epidemiology, and End Results (SEER) Program disclosed that the number of new cases and the deaths of SB cancer was 2.2 and 0.4 per 100,000 population per year, respectively.[6] The incidence has doubled over the past 40 years. Additionally, about 0.2% of population would have a chance to be diagnosed with SB cancer at some point during their lifetime, based on 2011–2013 SEER data.[6] Unfortunately, most of patients with SB cancers are diagnosed at late stage (only 31% at the local stage) because of its vague clinical symptoms in early course of the disease and difficulty in diagnostic approaching.[6] Therefore, to understand the epidemiology and improve the diagnostic technology, such as deep enteroscopy, are of paramount importance to tackle with this rare disease entity.[7,8]

The histological subtypes vary between different countries and approximately 40 different subtypes may be identified.[3] There are also time trends in the changing prevalence of different subtypes. Previously, adenocarcinoma presented the most common SB malignancy; however, the SEER registries have documented a 400% increase in the age-adjusted incidence of neuroendocrine tumors (NETs) of the small intestine over the past 30 years and becomes the most common SB cancer.[9] In the United States, the most common SB cancers are NETs (35–42%), adenocarcinomas (30–40%), lymphomas (15–20%) and sarcoma (10–15%) while gastrointestinal stromal tumors (GISTs) representing over 90% of the sarcoma subtype.[3,10] However, the data from Asian countries are different. In China, 33.33% of SB cancer patients had adenocarcinoma, 32.91% had leiomyosarcoma, and 26.67% had lymphoma, while in Thailand, GISTs (39.5%) represented the most common subtype followed by adenocarcinomas (25.9%) and lymphoma (24.3%).[11,12] Therefore, whether differences in genetic and environmental background between races and areas play an important role in the development of SB cancers should be further investigated.

In this study, we aim to investigate the epidemiology of SB tumors, including benign and malignant ones based on device-assisted deep enteroscopy database in a multicenter fashion.

Materials and methods

Study design

This multicenter retrospective study were approved by the ethics committee of each participating tertiary center (E-Da Cancer Hospital, Far Eastern Memorial Hospital, Mackay Memorial Hospital and Tri-Service General Hospital) and informed consent from individual patients was not required because of observational study design. Single-balloon enteroscopy (SIF-Q260, Olympus Corp., Tokyo, Japan) was utilized for small intestine examination by push-and-pull method under either intravenous propofol general anesthesia or moderate sedation by midazolam by anesthesiologists or gastroenterologists, respectively. The data for this study were obtained from electronic medical record of enteroscopy from 2006/11 to 2016/7. All patients were diagnosed with SB tumors based on endoscopic, radiological and pathological examination. Baseline demographic characteristics, clinical, radiologic and endoscopic findings were collected and analyzed to compare between each histological subtype of SB tumors.

Statistical analysis

Continuous data were expressed as means or medians [±standard deviation (SD) and ranges] and category data were described as number (percentage). The association of categorical and continuous variables was compared between groups using the chi-square test or Fisher's exact

Please cite this article in press as: Chung C-S, et al., Small bowel tumors: A digestive endoscopy society of Taiwan (DEST) multicenter enteroscopy-based epidemiologic study, Journal of the Formosan Medical Association (2017), http://dx.doi.org/10.1016/j.jfma.2017.09.003