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The Profile of Gastrointestinal Stromal Tumors (GISTs) at M. Djamil General Hospital Padang, Indonesia: A Descriptive Study on 28 Patients

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Abstract

Background: Gastrointestinal stromal tumors (GISTs) are the most frequently seen mesenchymal neoplasm in the digestive system. GISTs was originally described as smooth muscle tumor in the 1980s but advances in molecular diagnostic methods and immunohistochemistry moved GISTs into a different category from smooth muscle tumors. The study aims to report on epidemiological, clinical, immunochemical, and therapeutic characteristics of GISTs.
Methods: We performed a retrospective descriptive study of 28 cases of GIST in the gastroenterology and general surgery departments of M. Djamil General Hospital Padang, Indonesia was conducted from January 2019 to December 2021. Data collection using medical records of patients in M. Djamil General Hospital Padang, Indonesia. We reported different data: Age, sex, symptoms, site, and immunohistochemistry of the tumor.
Results: Our study included 28 patients 18 males (64,3%) and 10 females (35.7%), with a median age range of 51-60 years. The presenting symptoms were abdominal mass (53.6%), abdominal pain (14.3%), bloody or dark-colored stools (14.3%), constipation (7.1%), fatigue (7.1%), and nausea and vomiting in 1 case (3.6%). Sixteen patients (57.1%) had a primary tumor and twelve patients (42.9%) had further metastatic lesions. The tumors were found in the stomach (21.4%), small intestine (14.3%), rectum (14.3%), and in other sites such as the retroperitoneal, liver, and distal pancreas. The immunohistochemical study was performed in seven cases (expression of CD117 and DOG1), in four cases CD117 was positive, while in three cases CD117 was negative. In two cases, the expression of DOG1 was positive, while in one case, it was negative. Eighteen patients with GIST (64.3%) underwent surgical procedures. A combination of surgical and chemotherapy was prescribed in 9 patients (32.1%). The chemotherapy regimen prescribed is imatinib. One patient is inoperable and has received symptomatic treatment.
Conclusion : In conclusion, our result showed that GISTs are highest in the male population with an age range of 51-60 years. The most common symptom of GISTs is abdominal mass. Patients who have been diagnosed with GIST by histopathological examination do not always show positive expression in the immunohistochemical study. Surgical resection was indicated in the majority of patients, and a combination of surgery and chemotherapy is also prescribed as a treatment for patients with GIST.

Keywords: Gastrointestinal stromal tumors, Profile, Immunohistochemistry, Therapy

Introduction

Gastrointestinal stromal tumors (GISTs) are the most frequently seen mesenchymal neoplasm in the digestive system. [1] The incidence is 11-14 people in 1 million population/year. The median age at the time of diagnosis was 60-65 years. There is no sex predilection but some literature states that the incidence is slightly more dominant in males with male to female ratio was 1.1:1. [2,3]

GISTs was originally described as smooth muscle tumor in the 1980s but advances in molecular diagnostic methods and immunohistochemistry moved GISTs into a different category from smooth muscle tumors. [4] An important finding found in the GISTs study was the identification of c-KIT (CD117) antigen expression found in almost all GISTs, and differentiating GISTs from spindle cell tumors of the gastrointestinal system such as leiomyosarcoma and leiomyoma. About 95% of GISTs are positive for CD117 on immunohistochemistry, CT). [5]

Patients with GIST are presented in a variety of ways depending on their size and location. usually experience non-specific symptoms such as nausea, vomiting, abdominal distention, abdominal pain, and a palpable abdominal mass. About 18% of GIST patients are asymptomatic, so some patients come to health facilities when GIST is in its final stage. [6,7]

GISTs have several therapeutic modalities depending on risk stratification. GISTs risk stratification used the GISTs consensus criteria from the National Institutes of Health (NIH) which depended on tumor size, mitotic index, anatomical involvement of the tumor, and the age of the patient. GIST risk stratification is grouped into very low risk, low risk, intermediate risk, and very high risk. [8,9] GIST therapeutic modalities include surgery, endoscopic resection, anticancer drugs, radiotherapy, embolization, and radiofrequency ablation. Anticancer therapy is used in GIST cases that have metastasized, recurred, and can no longer be resected. Anticancer therapies that can be used include imatinib, avapritinib, sunitinib, regorafinib, avapritinib, sorafenib, nilotinib, pazopanib, and everolimus. [8]

The primary choice of management of patients with localized GIST is surgical resection. Recurrence can still occur even though resection has been performed on the patient, the risk of recurrence is influenced by several factors such as tumor location, size, and mitotic activity. [10] Patients with advanced GIST or who have metastasized only have a life expectancy of 10 to 20 months before the discovery of target inhibitor-based treatment, for this reason, Tyrosine Kinase Inhibitors (TKIs) are target inhibitor-based treatment which is the standard treatment for patients with advanced GISTs. Imatinib, sunitinib, and regorafenib are the traditional TKIs used for the treatment of advanced GISTs. [11]

Methods

Study Population
All study subjects were patients admitted to M. Djamil General Hospital Padang, Indonesia from January 2019 to December 2021. All patients were diagnosed with GIST and identified by histopathology and immunohistochemistry.

Data Collections
Data collection using medical records of patients in M. Djamil General Hospital Padang, Indonesia. We reported different data: Age, sex, symptoms, site, immunohistochemistry of the tumor, and therapy.

Statistical Analysis
Descriptive analysis was performed to characterize the age, sex, symptoms, site, immunohistochemistry, and therapy.

Ethics, Consent, and Permissions
The protocol for this study was approved by the Institutional Review Board of M. Djamil Hospital (No. LB.02.02/5.7/352/2022). Before being recruited as a subject, patients and/or their legal representatives were provided with informed consent.

Results

Twenty-eight patients were included: 18 males (64.3%) and 10 females (35.7%), with a median age range of 51-60 years. With an increase in frequency starting to show at the age range 41-50 years, it peaked in the age range 51-60 years.
The presenting symptoms were abdominal mass (53.6%), abdominal pain (14.3%), bloody or dark-colored stools (14.3%), constipation (7.1%), fatigue (7.1%), and nausea and vomiting in 1 case (3.6%). Table 1 shows the symptoms in GIST patients. Sixteen patients (57.1%) had a primary tumor and twelve patients (42.9%) had further metastatic lesions.

Table 1. Symptoms related to GISTs

Symptoms	Number	Percentage
Abdominal mass	15	53.6%
Nausea and vomiting	1	3.6%
Constipation	2	7.1%
Abdominal pain	4	14.3%
Fatigue	2	7.1%
Bloody or dark-colored stools	4	14.3%

The tumors were found in the stomach (21.4%), small intestine (14.3%), rectum (14.3%), and in other sites such as the retroperitoneal, liver, and distal pancreas. Table 2 shows the sites of the tumor. The immunohistochemical study was performed in seven cases (expression of CD117 and DOG1), in four cases CD117 was positive, while in three cases CD117 was negative. In two cases, the expression of DOG1 was positive, while in one case, it was negative.

Table 2. Sites of the tumor

Symptoms	Number	Percentage
Stomach	6	21.4%
Small intestine	4	14.3%
Rectum	4	14.3%
Other	14	64.3%

Eighteen patients with GIST (64.3%) underwent surgical procedures. A combination of surgical and chemotherapy was prescribed in 9 patients (32.1%). The chemotherapy regimen prescribed is imatinib. One patient is inoperable and has received symptomatic treatment. Table 3 shows the management of GISTs in this study.

Table 3. Management of GISTs

Management	Number	Percentage
Surgical	18	64.3%
Surgical and chemotherapy	9	32.1%
Symptomatic treatment	1	3.6%

Discussion

GISTs are not commonly recognized during life as most GISTs are asymptomatic. The precise incidence of GISTs is unknown is unknown. All GISTs are potentially malignant. [12] In this study, the patient's age ranged from 18 to 76 years at diagnosis with peak incidence in the 5th decade of life and male predominance (64.3%) which aligns with the result from previous studies where age at diagnosis ranged from 10 to 100 years, with peak incidence in the 8th decade of life. [12,13] Søreide *et al.* found the gender distribution was equal across studies. [12] But, our study showed a predominance of males diagnosed with GISTs. This result is probably due to geographical and racial differences where a combination of genetic, environmental, and lifestyle factors may vary among different populations. A study from Ijzerman *et al.* states that male patients more often had aggressive GISTs and this may lead the hospital admission. [14]

In our study, GIST patients had an abdominal mass as the main symptom (53.6%), followed by abdominal pain and bloody or dark-colored stools. Similar to previous studies, the most common presenting symptoms of GISTs are mass-like effects that lead to obstruction, distension, and discomfort or symptoms associated with ulceration/tumor rupture such as gastrointestinal bleeding, and abdominal pain. [3,15,16] The location where the tumor was commonly found was the stomach 63%, the small intestine 30%, and the rectum 3%, other literature also stated the colon as the most common site for GISTs. [3,15,17] This study showed more variation in the GISTs location. Mostly GISTs are found in the the stomach (21.4%), small intestine (14.3%), rectum (14.3%). There are also GISTs found in the liver, colon, mesentery, pancreas, and rectum reported. Tumors that fill almost all the abdominal cavums in 1 case are reported.

The approach to treating GISTs is surgical resection. If the tumor is large and suspected to have infiltrated other organs, the complete resection rate may decrease. [17,18] High-risk primary tumor or metastatic tumor is resected with administration of imatinib 400 mg daily for 12 months, or if the tumor is unresectable, neoadjuvant imatinib 400 mg daily followed by surgical resection is recommended. If complete resection can be achieved, surgical intervention in combination with imatinib is more effective.[17] Our patients received surgical resection 64.3% and a combination of surgical resection and imatinib 32.1%. 1 case is not operable and had received symptomatic treatment.

Conclusions

In conclusion, our result showed that GISTs are highest in the male population with an age range of 51-60 years. The most common symptom of GISTs is abdominal mass. Patients who have been diagnosed with GIST by histopathological examination do not always show positive expression in the immunohistochemical study. Surgical resection was indicated in the majority of patients, and a combination of surgery and chemotherapy is also prescribed as a treatment for patients with GIST.

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Declarations of competing interest

No potential competing interest was reported by the authors.

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