

Prevalence of Gastrointestinal Stromal Tumors in Babol's Hospitals from 2010 to 2020

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ABSTRACT

Background:

Gastrointestinal stromal tumors (GISTs) are the most common gastrointestinal mesenchymal neoplasms. The risk factors for GISTs are older age and inherited genetic syndromes. Moreover, lifestyle-related or environmental causes of GISTs are unknown, and due to the lack of a similar study in the Babol region, we decided to investigate the frequency of GISTs in hospitals in Babol.

Materials and Methods:

The present study is a cross-sectional study performed on 30 cases of GISTs in the pathology archive of hospitals in Babol from March 21, 2010, to March 20, 2021. Patients' information such as age, sex, family history, smoking, and clinical signs were evaluated.

Results:

In this study, the prevalence of GISTs was 5.81 per thousand. 16 (53.3%) patients were in the group of less than 57-year-olds, and 14 (46.7%) patients were aged more than 57 years. 18 (60%) patients were males and 12 (40%) were females. The stomach was the most common site of the stromal tumor, with a frequency of 16 (53.3%) cases. While the second and third categories were the esophagus with 10 (33.4%) cases and the intestine with 4 (13.3%) cases, respectively. Abdominal pain in 17 (56.7%) patients with stromal tumors was reported as the most common symptom.

Conclusion:

This study showed that the frequency of GISTs was similar to the results of studies inside and outside Iran. In addition, the prevalence of stromal tumors in the 50s and men was similar to other studies.

Keywords: Gastrointestinal stromal tumors, Neoplasms, Prevalence, Iran, Risk factors

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INTRODUCTION

Gastrointestinal stromal tumors (GISTs) are the most common mesenchymal tumors of the digestive tract (1). These tumors differ in proprietary immunophenotypic findings from other non-epithelial digestive tumors such as liposarcoma, neuroma, and neurofibroma (2). The 5-year survival rate of these tumors is 35-65%, indicating that these tumors can be fatal, however, the tumor's loss depends on the size, mitotic index, and tumor location (3). Immunohistochemistry studies show that GISTs originate from mesenteric ganglion cells of the digestive tract (Cajal cells) (4). In the histochemical findings, these cells contain CD117 and CD34, and diagnosis needs to be revised via finding cells that strongly express S100 and desmin (5).

GIST is less prevalent in people younger than 40 and can be found in all parts of the digestive system. However, the stomach is the most common area affected with 39% to 70%, while 20-32% in the small intestine, and in rare cases, 5% in the colon and rectum and 2% in the esophagus (6). In most cases, GIST is asymptomatic, but abdominal masses, abdominal pain, or bleeding are symptoms in advanced cases. About 10-30% of GISTs cases are accidentally diagnosed during laparotomy, endoscopy, or imaging surveys, and about 15-50% are characterized by metastasis (7). Surgery is the primary treatment of GISTs in patients with its resectable form (8).

Moreover, since they rarely metastasize into the lymph nodes, lymphadenectomy is not typical for these tumors (9). Therefore, radiotherapy does not have much effect on these patients. Before introducing KIT inhibitors called imatinib, it seemed that GISTs did not have an acceptable response to chemotherapy. However, today, imatinib has become the selective treatment of unresected and metastatic types (10).

Due to the climate, genetic, and nutritional differences in different societies, each society is expected to have a specific pattern in the prevalence of cancers. Hence, identifying the pattern and moving toward modifying the corresponding risk factors is one of the things we can do to influence the incidence of diseases. Therefore, due to the lack of similar studies in Babol, we decided to investigate the prevalence of GISTs in the teaching hospitals in Babol.

MATERIALS AND METHODS

In this cross-sectional study, based on available data in Babol hospitals, out of 31680 endoscopic patients and 19920 colonoscopic patients, 30 patients with a definitive diagnosis of GIST with IHC report and specifically positive CD117 (C-KIT protein) were enrolled. Those patients who did not reach a definitive diagnosis or had incomplete information were excluded from the study. The present study included 30 malignant gastrointestinal cases in the pathology archive of Babol treatment hospitals from March 21, 2010, to 20 March 20, 2021.

Patients' information including age, sex, family history, smoking, and clinical symptoms was studied.

The data were analyzed using SPSS software version 22. For qualitative data, frequency and frequency percentage, and for quantitative data, mean and standard deviation were used. A P value less than 0.05 was considered significant.

RESULTS

The mean age of the patients was 57.47 ± 9.64 years (the lowest and the highest ages were 35 and 72 years, respectively). The prevalence of GISTs in this study was 5.81 per thousand. It was found that 16 (53.3 %) patients were in the age group below 57-year-olds, and 14 (46.7 %) were aged above 57 years.

In this study, more than half of the patients were men. Most of them had a positive history of GISTs, and almost half of them were smokers. The average tumor size was 3.66 ± 1.38 cm (the smallest tumor size was 1.5 cm and the biggest tumor size was 6.4 cm, [Table 1](#)).

More than half of the patients had long-term bleeding and abdominal pain. Nearly two-thirds of the patients had ileus, bloating, nausea, and vomiting. Most of these

Table 1. Demographic features of patients with GISTs

Variables	Frequency (%) n=30	
Sex	Male	18 (60)
	Female	12 (40)
Positive Family history of GIST	Yes	27 (90)
	No	3 (10)
History of smoking consumption	Yes	14 (46.7)
	No	16 (53.3)

subjects did not have weight loss (Table 2).

In examining the location of GISTs, the intestines were the least frequently affected, with a frequency of nearly 10%. On the other hand, the stomach had more than half of the cases, and in the third rank was the esophagus (Figure 1).

DISCUSSION

This study was one of the few studies that investigated the prevalence of stromal tumors over the past decade in the northern part of Iran. The importance of evaluating the prevalence of different cancers such as GIST is that this type of tumor can occur in every part of the gastrointestinal tract from the lower esophagus to the anus. In addition, variable clinical behaviors in GISTs (benign

behavior to malignant and metastatic one), investigating the importance of target therapy in these types of tumors (11) and given that these tumors have not been reviewed in this area over the past decade, were the reasons that we decided to review their frequency and prevalence.

The prevalence of GISTs in ten years from 51 600 patients under endoscopy and colonoscopy is 5.81 per thousand. However, Miettinen and colleagues explained in their study that the actual prevalence of this tumor is difficult to determine (12).

The frequency of stromal tumors in different studies, for example, the prevalence of GISTs in the study by Rubio and others (13) and Tran and co-workers (14) was 6.5 and 6.8 per thousand, respectively, is almost similar to this study. It can even be said that the prevalence of GIST is less than in other studies, which could be due to the differences in sample size and geographical region. In the study by Tryggvason and colleagues (15) in 2005, the researchers collected 14-year data from Icelandic hospitals with a definite diagnosis of GIST. In this study, the annual incidence of these tumors was reported as 11 per ten thousand (15). The incidence of cancers differs among populations and is associated with factors such as occupational, social, cultural, racial, geographical, and nutritional issues (16). Furthermore, in the study of Mucciarini and co-workers (17) in 2007 and the study of Nilsson and colleagues (18) in 2002, the prevalence of GIST was reported to be almost three times that of our study. Along with the points mentioned, the difference is that these studies evaluated more data over an extended period than ours. More than 12 years of data have been examined in both of these studies.

The average age of patients with GISTs was 57 years, and the prevalence of disease in the 5th and 6th decades of life is higher than in other decades. Khorgami and colleagues report the incidence of GISTs in the 5th and 6th decades of life (19). In the research by Levy and others, more patients were more than 50 years old, and the incidence of the tumor was rare before age of 40 years (20). Zare and others found that the mean age of patients with GIST was 51 years (21). All of the above studies, along with the results of this study, showed that the tumor is more prevalent in the age group of 50 and 60 years old.

In this study, the incidence in men was 1.5 times that

Table 2. Clinical symptoms of patients with GISTs

Symptoms*		Frequency (%) n=30
Long-term bleeding	Yes	16 (53.3)
	No	14 (46.7)
Abdominal pain	Yes	17 (56.7)
	No	13 (43.3)
Bloating	Yes	20 (66.7)
	No	10 (33.3)
Nausea and vomiting	Yes	19 (63.3)
	No	11 (36.7)
Ileus	Yes	20 (66.7)
	No	10 (33.3)
Weight loss	Yes	11 (36.7)
	No	19 (63.3)

*It should be noted that some patients had more than one symptom.

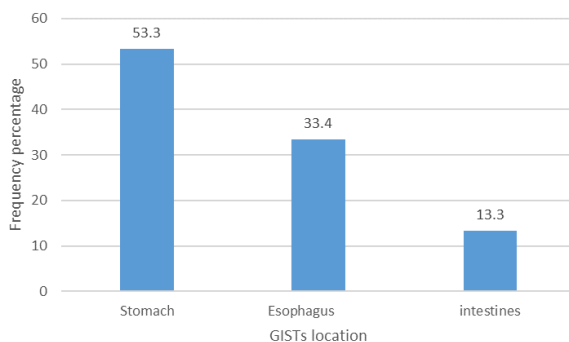


Figure 1. Distribution of the location of GISTs

in women. In the study by Hasegawa and colleagues on 171 GISTs cases, 96 cases were men, and 75 cases were women who had been 1.3 times more than men (4). Similarly, Levy and colleagues also found that the frequency of GIST was more common in men (20).

In different studies, the tumor size is associated with a patient's survival time. In this study, the mean stromal tumor size was 3.66 cm. Here, if the tumor size is less than 5 cm, the average time of survival without a tumor in the patient is 36 months. If the tumor size is 5 to 10 cm, time exceeds 19 months, and if the tumor size is more than 10 cm, time is reduced to 17 months. These findings can be used for future studies on tumor size and the average survival time (8,22).

In the study by Minzhi and colleagues, 57% of GISTs cases were in the stomach, and 33% were in the intestine (23). Also, the results of Dematteo's study show that 44% of cases were in the stomach, 41% in the small intestine, and less than 2% were in the large intestine (24).

Of all the results and reviews of the above studies, the stomach is considered the most common

location of the GISTs. However, in our study, the stomach, esophagus, and small intestine were the most common sites. Increasing the prevalence of esophageal GISTs compared with the small intestine in this area may be related to patients' healthy behavior due to the esophagus's more common cancer in the north of Iran.

Most of our patients reported long-term bleeding, abdominal pain, and less weight loss. Miettinen and colleagues reported that the most common symptom was gastrointestinal hemorrhage due to mucosal ulcers. Other symptoms include nausea, vomiting, abdominal pain, weight loss, abdominal distension, intestinal obstruction, and dysphagia (12). The difference in common symptoms can be due to clinicopathological characteristics such as size, location, or tumor morphology in the two studies.

CONCLUSION

Due to the climate, genetic, and nutritional differences in different societies, each society is expected to have a particular pattern in the rating of different outbreaks of cancers. However, identifying the pattern and movement to remove the corresponding risk factors is a minor work towards the incidence of diseases. This study showed

that the frequency of GISTs was similar to the results of domestic and foreign studies. In addition, the prevalence of stromal tumors in the 50s and men was like in other studies.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

CONSENT FOR PUBLICATION

Not applicable.

ETHICAL APPROVAL

The study protocol was approved by the Ethics Committee of Babol University of Medical Sciences (ethical code: IR.MUBABOL.REC.1399.443).

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REFERENCES

- Miettinen M, Lasota J. Gastrointestinal stromal tumors- definition, clinical, histological, immunohistochemical, and molecular genetic features and differential diagnosis. *Virchows Arch.* 2001;438(1):1-12.
- Ando N, Goto H, Niwa Y, Hirooka Y, Ohmiya N, Nagasaka T, et al. The diagnosis of GI stromal tumors with EUS-guided fine needle aspiration with immunohistochemical analysis. *Gastrointest Endosc.* 2002;55(1):37-43.
- Roberts PJ, Eisenberg B. Clinical presentation of gastrointestinal stromal tumors and treatment of operable disease. *Eur J Cancer.* 2002;38 Suppl 5:S37-8.
- Hasegawa T, Matsuno Y, Shimoda T, Hirohashi S. Gastrointestinal stromal tumor: consistent CD117 immunostaining for diagnosis, and prognostic classification based on tumor size and MIB-1 grade. *Hum Pathol.* 2002;33(6):669-76.
- Coindre JM, Emile JF, Monges G, Ranchère-Vince D, Scoazec JV. Gastrointestinal stromal tumors: definition, histological, immunohistochemical, and molecular features, and diagnostic strategy. *Ann Pathol.* 2005;25(5):358-85; quiz 357.
- Tolga Kafadar M, Çavuş T, Sürgit O, Köktener A. Endometriosis of the rectosigmoid colon mimicking gastrointestinal stromal tumor. *Turk J Surg.* 2020; 36(4):409-412.
- Joensuu H, Fletcher C, Dimitrijevic S, Silberman S, Roberts P, Demetri G. Management of malignant gastrointestinal stromal tumours. *Lancet Oncol.* 2002; 3(11): 655-64.
- D'Amato G, Steinert MD, McAuliffe CJ, Trent CJ. Update on the biology and therapy of gastrointestinal stromal tumors. *Cancer Control.* 2005;12(1): 44-56.
- Reichardt P, Pink D, Mrozek A, Lindner T, Hohenberger P. Gastrointestinal stromal tumors (GIST). *Z Gastroenterol.* 2004;42(4):327-31.
- Savage DG, Antman KH. Imatinib mesylate--a new oral

- targeted therapy. *N Engl J Med.* 2002;346(9):683-93.
11. Sorour MA , Kassem MI , Ghazal AEA , El-Riwini MT , Abu Nasr A. Gastrointestinal stromal tumors (GIST) related emergencies. *Int J Surg.* 2014;12(4): 269-80.
 12. Miettinen M, Majidi M, Lasota J. Pathology and diagnostic criteria of gastrointestinal stromal tumors (GISTs): a review. *Eur J Cancer.* 2002;38 Suppl 5:S39-51.
 13. Rubió J , Marcos-Gragera R, Ortiz M R, Miró J, Vilardell L, Gironès J , et al. Population-based incidence and survival of gastrointestinal stromal tumours (GIST) in Girona, Spain. *Eur J Cancer.* 2007;43(1):144-8.
 14. Tran T, Davila JA, El-Serag HB. The epidemiology of malignant gastrointestinal stromal tumors: an analysis of 1,458 cases from 1992 to 2000. *Am J Gastroenterol.* 2005;100(1):162-8.
 15. Tryggvason G , Gíslason HG, Magnússon MK, Jónasson GJ. Gastrointestinal stromal tumors in Iceland, 1990–2003: The Icelandic GIST study, a population-based incidence and pathologic risk stratification study. *Int J Cancer.* 2005;117(2):289-93.
 16. HAJIAN K, Firouzjahi A, Kia M. Pattern of age distribution of different cancers in Babol, 2001. *Pajouhesh dar Pezeshki.* 2003;27(3): 239 - 245.
 17. Mucciariini C , Rossi G, Bertolini F, Valli R, Cirilli C, Rashid I, et al. Incidence and clinicopathologic features of gastrointestinal stromal tumors. A population-based study. *BMC Cancer.* 2007;7(1):1-7.
 18. Nilsson B , Bümbling P, Meis-Kindblom JM, Odén A, Dortok A, Gustavsson B, et al. Gastrointestinal stromal tumors: the incidence, prevalence, clinical course, and prognostication in the preimatinib mesylate era: a population-based study in western Sweden. *Cancer.* 2005;103(4): 821-829.
 19. Khourgami z. Gastrointestinal stromal tumors (review of literature). *Iran J Surg.* 2008; 16(3).
 20. Levy AD , Remotti HE, Thompson WM, Sobin LH, Miettinen M. Gastrointestinal stromal tumors: radiologic features with pathologic correlation. *Radiographics.* 2003. 23(2):283-304, 456; quiz 532.
 21. Zare'Mehrjardi A, Sami'ee Rad F. A Morphologic and Immunohistochemical Study of Gastrointestinal Stromal Tumors (GIST) and Value of C-kit Expression in their Histomorphologic Diagnosis. *Razi J Med Sci.* 2007;14(55):107-114.
 22. Levy AD , Remotti HE, Thompson WM, Sobin LH, Miettinen M. Biological and clinical significance of cytogenetic abnormalities in low-risk and high-risk gastrointestinal stromal tumors. *Hum Pathol.* 2002;33(3):316-21.
 23. Lv M , Wu C, Zheng Y, g Zhao N. Incidence and survival analysis of gastrointestinal stromal tumors in shanghai: a population-based study from 2001 to 2010. *Gastroenterol Res Pract.* 2014;2014:834136.
 24. DeMatteo RP , Lewis JJ, Leung D , Mudan SS, Woodruff JM , Brennan MF. Two hundred gastrointestinal stromal tumors: recurrence patterns and prognostic factors for survival. *Ann Surg* 2000;231(1):51-8.