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Mesenchymal Tumors in Gastrointestinal Tract

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Abstract

Mesenchymal neoplasms arising in the digestive tract are rare compared to adenomas and carcinomas [1]. They include several entities with histomorphological similarity and immunohistochemistry helps to confirm the diagnosis [2]. Our goals are to study the epidemiological aspect of mesenchymal tumors, and to compare the histological diagnoses before and after the use of immunochemistry. This is a retrospective, descriptive, single-center study performed on all cases of mesenchymal tumors in gastrointestinal tract, diagnosed at the laboratory of Pathological Anatomy Unit of Joseph Ravoahangy Andrianavalona University Hospital from January 1, 2007 to December 31, 2018. We included 29 cases. The mean age was 43.28 years. The sex ratio was 1.07. After immunohistochemical examination, 24.14% of tumors changed diagnosis to GISTs which are the most common mesenchymal tumor involving the gastrointestinal tract. In all cases of mesenchymal tumors of the gastrointestinal tract GIST should first be ruled out before making other diagnoses. Histologic and immunophenotypic features are thereby essential. According to the literature review, if c-Kit and DOG-1 are negative, molecular biology must be used.

Keywords

Stromal Tumor, Gastrointestinal, Epidemiology, Diagnosis

1. Introduction

Gastrointestinal mesenchymal tumors are rare but more frequent than those of other visceral organs [3] [4]. They include conventional soft tissue entities like lipoma, leiomyoma or nerve sheath tumors and entities entirely restricted to the gastrointestinal tract like gastrointestinal stromal tumor (GIST), plexiform fibromyxoma, Schwann cell hamartoma, and inflammatory fibroid polyp [2].

Most of them have many overlapping histologic features; therefore, they may be difficult to classify accurately [3]. Histomorphologic evaluation, basic clinical information (example: site) and a small panel of immunohistochemical stains are required to accurately classify a gastrointestinal mesenchymal neoplasm [2].

Our purpose is to study the epidemiological aspect of mesenchymal tumors, and to compare the histological diagnoses before and after the use of immunochemistry.

2. Materials and Method

We performed a retrospective, descriptive, single-center study of mesenchymal tumors diagnosed at the laboratory of Pathological Anatomy Unit of Joseph Ravoahangy Andria-navalona University Hospital, Antananarivo, Madagascar, over a twelve-year period (2007 to 2018). Mesenchymal tumors with immunohistochemical stains were included in the study. Lesions other than mesenchymal tumors were not included and we excluded all presumed mesenchymal tumors without immunohistochemical stains. We studied the following parameters: age, sex, lesion topography, and pathological parameters including histological findings before and after immunohistochemical stains.

We used the standard technique. The specimens were fixed in 10% buffered formalin, processed according to the conventional histological slide preparation technique, and stained with Hematoxylin-Eosin (HE) and immunohistochemical stains (anti-CD 117 and anti-CD 34 antibodies for the diagnosis of GIST, Smooth Muscle Actin for smooth muscle tumors, and PS 100 for nerve tumors).

3. Results

A total of 29 mesenchymal tumors of the gastrointestinal tract were identified. There were almost as many men as women, with a sex ratio of 1.07. The age of patients ranged from 1 to 78 years. The average age was 43,28 years and the most affected age group was between 40 and 59 years (**Table 1**). The organs involved were, in order of frequency, the stomach (37.93%), followed by the colon (34.48%), and small intestine (27.59%). There were no esophageal cases. Of the 29 cases, 21 (72.41%) were malignant, and 8 (27.59%) benign. Before immunohistochemical examination, the histological types were divided into: GIST (55.17%), benign spindle cell tumors (13.79%), leiomyoma (10.34%), malignant spindle cell tumors (06.90%), leiomyosarcoma (06.90%), schwannoma (03.45%), Kaposi's sarcoma (03.45%). After immunohistochemistry: GIST accounted for

Table 1. Gender distribution by age group.

	[0 to 20[	[20 to 39[	[40 to 59[	[60 to 79[	Total
Women	1	7	5	1	14
Men	2	2	7	4	15
Total	3	9	12	5	29

79.31%, leiomyosarcoma and leiomyoma 6.90% each, schwannoma and Kaposi's sarcoma 3.45% each. Thus, 24.14% of tumors changed diagnosis to GIST. **Table 2** summarizes the difference in histological types before and after immunohistochemical examination (**Table 2**).

4. Discussion

Mesenchymal tumors of the gastrointestinal tract are rare. They are often discovered incidentally or not detected until the death of the individual. Hence its real incidence would be difficult to establish [5]. In 12 years of study, we have collected 29 cases of mesenchymal tumors of the gastrointestinal tract. Other studies conducted made in the Pathology Departments of Tunis [6] and Sousse [7] (Tunisia) reported respectively 22 cases in 198 years and 40 cases in 14 years. The stomach was the most affected organ in our study, followed by the colon and intestine. Salma Kamoun [6] also reported a gastric predominance of 61.11%, and intestinal one of 38.88%.

In 2002, the World Health Organization (WHO) reclassified the mesenchymal tumors of the gastrointestinal tract [8] to include gastrointestinal stromal tumors (GIST), tumors derived from Cajal cells, with the c-kit gene mutation. Previously, these tumors were diagnosed as muscle, nerve, or desmoid tumors. But after the discovery of the c-Kit gene in 1998, many of these tumors were recognized as being of interstitial Cajal cell origin [9] [10]. It is important to exclude first the diagnosis of GIST, especially in the stomach and small intestine, before considering other diagnoses. Indeed, the distribution and frequency of mesenchymal neoplasms vary considerably according to anatomic regions of the gastrointestinal tract [3]. GISTs are most commonly found in the stomach and small intestine [11] and they represent the most frequent mesenchymal lesion in all parts of the digestive tract, except in the oesophagus, where leiomyomas are more frequent [12]. In our study, GIST is the most frequent mesenchymal lesion in all parts of the digestive tract (**Table 3**). It occurred mainly in the stomach and small intestine while the non-GIST lesions are mostly seen in the colon and stomach. Seven GISTs were diagnosed as other tumors before immunohistochemical examination in our series. Hence, the diagnosis of GIST is made on histological and immunohistochemical features. All c-Kit positive tumors (23 cases, 79.31%) were GISTs. However, it is not possible to formally rule out the diagnosis of GIST for the rest, because about 5% of GISTs are c-Kit negative [13]. The causes are numerous, ranging from simple technical problems to loss of c-kit expression during the clonal evolution of the tumor, some congenital GISTs do not also express c-kit [11]. In our series, 6 mesenchymal tumors were c-kit negative. Apart from Kaposi's sarcoma, tumors labeled as muscle and nerve tumors could be GISTs even if c-kit negative, especially since in GISTs an expression of some muscle (smooth muscle actin, desmin) or nerve (PS 100) markers can be observed, but it is usually weak and focal, unlike smooth muscle and nerve tumors [10]. The study of Trabelsi [7] in Sousse had found 9.09% expression of

Table 2. The difference in histological types before and after immunohistochemical examination.

Diagnostics proposed by histology	Diagnostic after immunohistochemical examination				
	GIST	Leiomyosarcomas	Leiomyomas	Schwannoma	Kaposi's sarcoma
GIST	16	0	0	0	0
Benign spindle cell tumor	3	0	1	0	0
Leiomyomas	2	0	1	0	0
Malignant spindle cell tumor	2	0	0	0	0
Leiomyosarcomas	0	2	0	0	0
Schwannoma	0	0	0	1	0
Kaposi's sarcoma	0	0	0	0	1

a. GIST: Gastrointestinal Stromal Tumor.

Table 3. Anatomical distribution of mesenchymal tumors.

Organs	Diagnostics after immunohistochemical examination				
	GIST	Kaposi's sarcoma	Leiomyoma	Leiomyosarcoma	Schwannoma
Colon	7	0	1	1	1
Stomach	8	1	1	1	0
Small intestine	8	0	0	0	0

a. GIST: Gastrointestinal Stromal Tumor.

AML (smooth muscle cell marker) and 6.06% expression of PS 100 (nerve tumor marker) in their GIST. DOG 1 is also an antibody used to recognize GIST. It was not used in our study, although its use increases the sensitivity of immunohistochemistry by 15% [6]. In the literature, DOG 1 positivity in c-Kit negative GISTs is variable depending on the antibody cloned used: with DOG 1.1, the positivity varies from 20% to 36% [14], while with the K9 clone the positivity varies from 50% to 76% [14]. In the study by Salma Kamoun [6], this antibody was positive in 50% of c-Kit negative GISTs.

Immunohistochemically CD117/DOG1-negative GISTs account for less than 5% of GISTs [15]. In this case, genetic analysis is necessary to search PDGFRA or KIT mutation in order to confirm the diagnosis of GIST [16].

Limit of the study: it is a monocentric study which does not reflect the reality in our country.

5. Conclusion

After Mesenchymal tumors of the gastrointestinal tract are rare, GIST is the

most common histological type. Standard pathological examination guides the diagnosis, which is confirmed by immunohistochemistry. Molecular biology is only useful in cases of double negativity of c-Kit and DOG-1.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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