



Endoscopic diagnosis of gastric metastases from malignant melanoma: systematic review

Helena Campoli Reggiani¹, Ana Clara Aguiar Pongeluppi¹, Vitória Froes Miraglia Martins Ferreira¹, Isadora Pinheiro Felix¹, Paulo Moacir de Oliveira Campoli²

¹School of Medical Sciences of Minas Gerais, Belo Horizonte; ²Department of Digestive Endoscopy, Araujo Jorge Hospital, Goiania, Brazil

Background/Aims: Metastases of malignant melanoma (MM) are rare and associated with poor prognosis. The objective of this study was to analyze the clinical and endoscopic characteristics of gastric metastases of MM by systematically reviewing cases and case series involving patients diagnosed using upper gastrointestinal endoscopy.

Methods: The PubMed and LILACS databases were searched. Reports containing individual patient data were included. Outcomes such as clinical data, endoscopic findings, treatments, and survival were analyzed.

Results: A total of 88 studies with individual data from 113 patients with gastric metastases of MM were included. The primary sites of MM were the skin (62%), eyes (10%), and mucous membranes (6%). Most patients (56%) had multiple metastases in the stomach, located predominantly in the gastric body (approximately 80%). The overall survival rate at 2 years was 4%. There was a significant reduction in the survival of patients with multiple gastric metastases compared to that of patients with single metastasis (hazard ratio, 0.459; 95% confidence interval, 0.235–0.895; $p=0.022$).

Conclusions: Gastric metastases of MM have a poor prognosis, especially in patients with multiple implants in the stomach. Additional studies are needed to verify whether ocular and mucosal melanomas are associated with a higher risk of gastric metastases than that of cutaneous melanomas.

Keywords: Gastrointestinal endoscopy; Melanoma; Neoplasm metastasis; Stomach neoplasms; Systematic review

INTRODUCTION

Malignant melanoma (MM) is an aggressive neoplasm that carries a significant risk of locoregional and distant metastases. The differential diagnosis between gastric metastasis of MM and primary melanoma of the stomach is performed based on the failure to identify the primary MM at another site. Primary

melanoma of the stomach is rarer than gastric metastasis; a recent systematic review identified only 25 case reports describing primary melanoma of the stomach.¹ Gastrointestinal involvement in cases of disseminated disease is common, especially in the small intestine. Secondary involvement of the stomach is rare and poorly described.²

The diagnosis of gastric metastasis of MM is often made through a postmortem.³ Few publications have described cases diagnosed using upper gastrointestinal endoscopy. Therefore, knowledge regarding the clinical characteristics, endoscopic data, treatment, and survival of this condition is limited.

The present study aimed to compile relevant data and analyze the clinical and endoscopic characteristics of MM gastric metastases by systematically reviewing cases and case series describing patients diagnosed using upper gastrointestinal endoscopy.

Received: December 29, 2021 **Revised:** February 23, 2022
Accepted: February 28, 2022

Correspondence: Helena Campoli Reggiani
 School of Medical Sciences of Minas Gerais, 275 Alameda Ezequiel Dias Street, Centro, Belo Horizonte, Minas Gerais 30130-110, Brazil
E-mail: helena.reggiani@hotmail.com

© This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

METHODS

Search strategy

We performed a systematic review in accordance with the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).⁴ Case reports and case series of gastric metastases of MM diagnosed using upper gastrointestinal endoscopy were analyzed.

The searches were performed without restrictions on language or publication date. High-sensitivity searches were performed using the Medline/PubMed and Latin American and Caribbean Health Sciences Literature (LILACS) databases using the following MeSH terms: stomach neoplasms, melanoma, and gastrointestinal endoscopy. To identify additional eligible studies, the references of the included studies were manually searched.

After screening the titles and abstracts of the articles retrieved from the databases, the full texts of potentially eligible studies were examined by independent reviewers, and the inclusion criteria were applied. Disagreements between the reviewers were resolved by consensus.

Inclusion and exclusion criteria

Case reports and case series describing metastatic MM of the stomach, diagnosed using upper gastrointestinal endoscopy, were included. We excluded cases of primary stomach melanoma. Case series that did not present individual patient data were also excluded. If the same study was published more than once, the publications with more complete information were selected.

Data extraction

Individual patient data were extracted by independent reviewers using a predefined form. Clinical data such as those of age, sex, primary site of MM, metastases in other organs, and symptoms presented by the patients were collected. We also collected information on the number and location of lesions in the stomach. Finally, data on the treatments and their outcomes were obtained.

Data analysis

Medians or means and standard deviations were calculated for continuous variables, while frequencies and percentages were calculated for categorical variables. Student *t*-test was used to compare continuous variables, and chi-square test or Fisher exact test was used to compare categorical variables. For individu-

al patient data that included survival time, survival curves were calculated by Kaplan-Meier analysis, and differences between the curves were analyzed using the log-rank test.

Statistical analyses were performed using the MedCalc ver. 20.011 (MedCalc Software, Ostend, Belgium). Differences were considered statistically significant at $p < 0.05$.

RESULTS

Study selection and population characteristics

The databases were searched from their inception to November 20, 2021, and 2,812 publications were identified. After screening the titles and abstracts, 2,652 articles were excluded. Twenty-six additional articles were identified by a manual search, resulting in 186 potentially eligible studies. After analyzing the full texts using the eligibility criteria, 88 articles remained for the analysis (Fig. 1).

Among the 88 included studies, eight were case series,^{2,3,5-10} and the other 80¹¹⁻⁹⁰ reported only one case each. Thus, the individual data of 113 patients with gastric metastases of MM were analyzed (Fig. 2).

The patients' ages ranged from 25 to 89 years (median, 63 years), and 64% of the patients were male. The most common symptoms were digestive bleeding (34.5%) and abdominal pain (34.5%).

The primary site of MM was reported in 78% of the patients and the skin was the most reported site (62%). Primary melanoma with an ocular location was described in 10% of the cases, and melanoma originated from the mucosal surfaces in 6% of the cases (Table 1).

Among the 113 patients with gastric metastases, 24 had metastases in the stomach only (21%) while 89 had metastases in other organs (79%) as well. The number of distant metastases in each of the 113 patients ranged from one to seven different sites (Table 2). In addition to the stomach, the other most affected organs were the lungs, liver, lymph nodes, duodenum, and central nervous system (Table 2).

A high percentage of the patients received chemotherapy (46%) or only palliative care (24%). Only 20 patients (18%) underwent surgery for gastric metastases.

Endoscopic findings

Single metastasis in the stomach was reported in 48 patients (42%) and multiple metastases were observed in 63 patients (56%). Data regarding the number of stomach metastases were

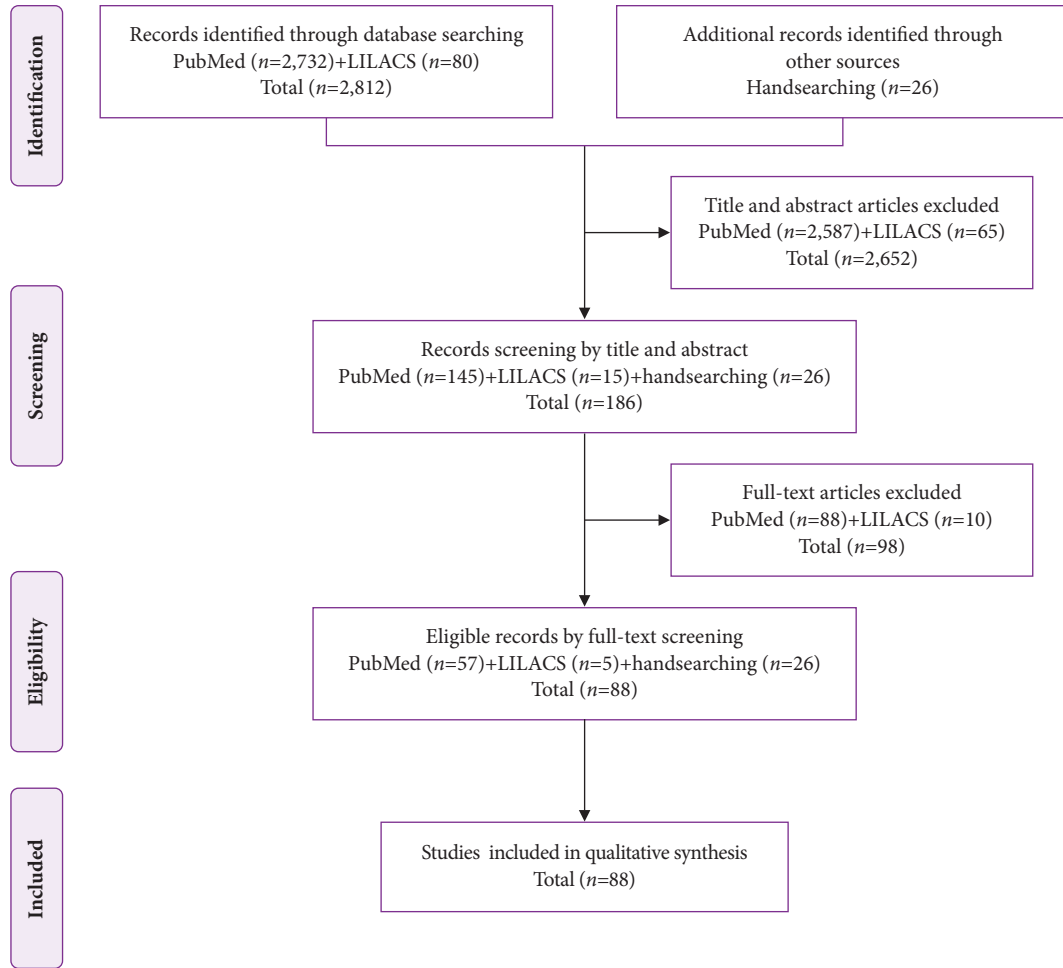


Fig. 1. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram of study selection. LILACS, Latin American and Caribbean Health Science Literature.

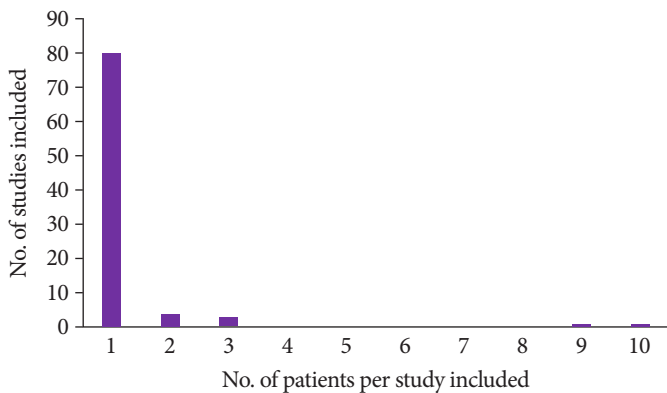


Fig. 2. Among the 88 studies, 80 included one case. The other eight studies were case series. Four studies had two patients each, two studies had three patients, one study had nine patients, and one study had ten patients.

not reported for two patients. Metastases was predominantly located in the gastric body (in approximately 80% of the cases). In only 5% of the patients, metastases were exclusively located in the gastric antrum (Table 3). The reports on the endoscopic characteristics of the lesions could not be validated as they varied widely, thus precluding the synthesis of these data.

Survival

In the present study, the overall 1-year survival rate was 16% and the 2-year survival rate was only 4%. The median survival time was 3 months. There was a significant reduction in the survival of patients with multiple gastric metastases compared to that of patients with single metastasis (hazard ratio for death, 0.459; 95% confidence interval, 0.235–0.895; $p=0.022$) (Fig. 3).

Table 1. Characteristics of the patients

| Characteristic | Value |
|--------------------------------|-----------|
| Age (yr) | |
| Mean±SD | 62.2±12.6 |
| Median (IQR) | 63 (18.5) |
| Range | 25–89 |
| Sex | |
| Male | 72 (64.0) |
| Female | 41 (36.0) |
| Symptom | |
| Bleeding | 39 (34.5) |
| Abdominal pain | 39 (34.5) |
| Anorexia and weight loss | 26 (23.0) |
| Nausea and vomiting | 20 (17.7) |
| Weakness | 7 (6.2) |
| Dyspepsia | 6 (5.3) |
| Dyspnea, cough, and chest pain | 5 (4.4) |
| Jaundice | 3 (2.7) |
| Dysphagia | 2 (1.8) |
| Other symptoms | 4 (3.5) |
| Asymptomatic | 11 (9.7) |
| Primary location | |
| Cutaneous | 70 (62.0) |
| Eye | 11 (9.7) |
| Mucosa | 7 (6.2) |
| Not reported | 25 (22.1) |

Values are presented as number (%) unless otherwise indicated. SD, standard deviation; IQR, interquartile range.

DISCUSSION

The present systematic review confirmed that patients with gastric metastases of MM have very low overall survival rate (2-year survival rate of 4%) and median survival of only three months. In addition, this study demonstrated that patients with single metastasis in the stomach had significantly higher overall survival than patients with multiple gastric metastases. A study by Kim et al.³ reported a similar result; the authors analyzed 37 patients with gastric metastases from several primary sites. Surgical treatment of MM metastases in the gastrointestinal tract is associated with increased survival.⁷ Thus, early detection followed by gastrectomy is key to obtaining better results.

According to a study involving more than 133,000 cases of MM, the prevalence of cutaneous melanoma, ocular melanoma, and mucosal melanoma was 94.9%, 3.7%, and 1.4%, respectively.⁹¹ However, in the present study, the prevalence of cutaneous melanoma, ocular melanoma, and mucosal melano-

Table 2. Characteristics of metastases

| Characteristic | No. (%) |
|-------------------------------|-----------|
| Distant metastases | |
| Stomach (only) | 24 (21.2) |
| Stomach plus a single organ | 31 (27.5) |
| Stomach plus two organs | 20 (17.7) |
| Stomach plus three organs | 20 (17.7) |
| Stomach plus four organs | 12 (10.6) |
| Stomach plus five organs | 5 (4.4) |
| Stomach plus six organs | 1 (0.9) |
| Organs affected by metastases | |
| Stomach | 113 (100) |
| Lung | 39 (34.5) |
| Liver | 36 (31.9) |
| Lymph nodes | 25 (22.1) |
| Duodenum | 22 (19.5) |
| Central nervous system | 20 (17.7) |
| Bone | 16 (14.2) |
| Adrenal | 9 (8.0) |
| Subcutaneous | 7 (6.2) |
| Jejunum/ileum | 7 (6.2) |
| Spleen | 5 (4.4) |
| Esophagus | 4 (3.5) |
| Pancreas | 4 (3.5) |
| Skin | 3 (2.7) |
| Colon | 3 (2.7) |
| Rectum | 2 (1.8) |
| Peritoneum | 2 (1.8) |
| Breast | 1 (0.9) |
| Thyroid | 1 (0.9) |
| Amygdala | 1 (0.9) |
| Bladder | 1 (0.9) |
| Pericardium | 1 (0.9) |
| Kidney | 1 (0.9) |

Table 3. Endoscopic findings

| Variable | No. (%) |
|--------------------|-----------|
| Gastric metastases | |
| Single | 48 (42.5) |
| Multiple | 63 (55.7) |
| Not reported | 2 (1.8) |
| Gastric location | |
| Body (only) | 68 (60.2) |
| Body and antrum | 22 (19.5) |
| Antrum (only) | 6 (5.3) |
| Not reported | 17 (15.0) |

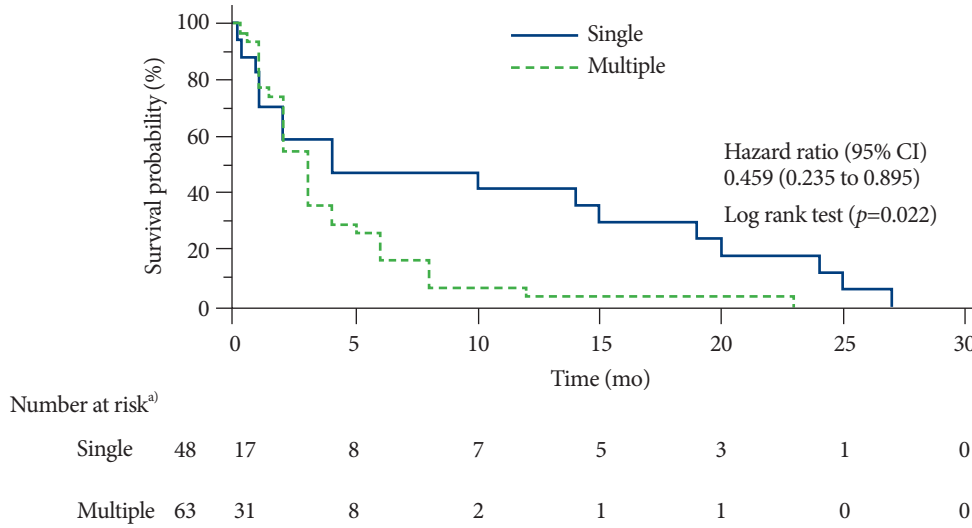


Fig. 3. Estimated overall survival by Kaplan-Meier analysis. Patients with multiple gastric metastases were compared to patients with single gastric metastasis. CI, confidence interval. ^{a)}Number of patients at risk of survival.

ma was 61.9%, 9.7%, and 6.2%, respectively. Despite the small number of cases in the present review and the high percentage of unreported primary sites (22.1%), the hypothesis is that primary ocular and mucosal melanomas present a greater risk of dissemination to the stomach. Primary mucosal melanomas confer a high risk of distant metastases, ranging from 16.7% to 27.7%.^{92,93}

Upper gastrointestinal endoscopy plays an important role in the diagnosis of gastric metastases. In 1962, Reed et al.⁹⁰ published the first case of gastric metastasis of MM diagnosed using endoscopic biopsy. Before the emergence of modern upper gastrointestinal endoscopy, gastric metastases of MM were described as “bull’s-eye” or “target-sign” lesions on radiological examinations.^{94,95} However, this radiological imaging pattern may be found in several other diseases, such as lymphoma, carcinoma, Kaposi’s sarcoma, and other uncommon benign diseases.⁸⁸

In 1978, Nelson and Lanza⁹⁶ presented a proposal for an endoscopic classification system that consisted of three types of gastric lesions: (1) nodules varying in size, usually appearing to arise on the crest of the normal rugae, often ulcerated at the tip, and invariably melanotic; (2) raised, submucosal tumor-like masses with ulcerated centers which usually produced the so-called bull’s-eye configuration on radiologic examination, and did or did not exhibit melanin grossly; and (3) mass lesions with varying degrees of necrosis and melanosis. This classification system has been used by several authors.^{86,88} In 2001,

Oda et al.⁹⁷ presented a proposal for an endoscopic classification system of metastatic tumors of the stomach that included several primary sites. The lesions were classified into two main patterns: submucosal tumors (with or without central depression) or primary gastric cancer. Lesions similar to primary gastric cancer were subdivided into those similar to early gastric cancer and those similar to advanced gastric cancer. Finally, lesions such as advanced gastric cancer were classified as follows: type 1, polypoid; type 2, ulcerated with well-defined margins; type 3, ulcers with undefined margins; type 4, tumors with diffuse infiltration. Several authors have adopted this classification.^{3,6,30,98} In addition, elevated lesions without infiltration of the edges and with central ulceration are commonly referred to as volcano-like or donut-shaped. These various proposals for endoscopic characterization generated high variability among the included studies, which precluded the compilation of lesion characteristics in the present review.

An important endoscopic finding in this review was that of the high percentage of metastases located in the gastric body. This characteristic has been described earlier,⁹⁹ and recently by other authors.^{3,97,100} The pathophysiological mechanism underlying the greater preference for involvement of the gastric body remains unknown.

A strength of the present study was that relevant data pertaining to an infrequent but highly severe condition were obtained. Using individual patient data, it was possible to construct and compare survival curves. The limitations of this review include

the limited scope of the search, which was conducted in only two databases, and the retrospective nature of the cases reported in the included studies.

In conclusion, the spread of MM to the stomach is associated with poor prognosis, particularly in cases with multiple gastric metastases. Further studies are needed to assess whether ocular melanomas and mucosal surface melanomas are associated with a higher risk of gastric metastases than that of cutaneous melanomas. Finally, standardization of the macroscopic description of gastric metastases is necessary to facilitate better standardization of reports.

Ethical Statements

Not applicable.

Conflicts of Interest

The authors have no potential conflicts of interest.

Funding

None.

Author Contributions

Conceptualization: HCR, ACAP, VFMMF, IPF, PMOC; Data curation: HCR, ACAP, VFMMF, IPF, PMOC; Formal analysis: HCR, ACAP, VFMMF, IPF, PMOC; Investigation: HCR, ACAP, VFMMF, IPF, PMOC; Methodology: PMOC; Project administration: HCR; Supervision: PMOC; Validation: PMOC; Visualization: HCR, ACAP, VFMMF, IPF, PMOC; Writing—original draft: HCR, ACAP, VFMMF, IPF, PMOC; Writing—review & editing: PMOC.

ORCID

| | |
|---|---|
| Helena Campoli Reggiani | https://orcid.org/0000-0002-6190-1246 |
| Ana Clara Aguiar Pongeluppi | https://orcid.org/0000-0001-9643-242X |
| Vitória Froes Miraglia Martins Ferreira | https://orcid.org/0000-0001-9973-0430 |
| Isadora Pinheiro Felix | https://orcid.org/0000-0003-2205-6729 |
| Paulo Moacir de Oliveira Campoli | https://orcid.org/0000-0001-7038-5637 |

REFERENCES

- Schizas D, Tomara N, Katsaros I, et al. Primary gastric melanoma in adult population: a systematic review of the literature. *ANZ J Surg* 2021;91:269–275.
- Strippoli S, Ruggeri E, Fucci L, et al. The evolving landscape in the management of gastric metastases from melanoma: a case series. *Clin Pract* 2018;16:1079–1084.
- Kim GH, Ahn JY, Jung HY, et al. Clinical and endoscopic features of metastatic tumors in the stomach. *Gut Liver* 2015;9:615–622.
- Moher D, Liberati A, Tetzlaff J, et al. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Ann Intern Med* 2009;151:264–269.
- Trouillet N, Robert B, Charfi S, et al. Gastric metastases: an endoscopic series of ten cases. *Gastroenterol Clin Biol* 2010;34:305–309.
- Campoli PM, Ejima FH, Cardoso DM, et al. Metastatic cancer to the stomach. *Gastric Cancer* 2006;9:19–25.
- Liang KV, Sanderson SO, Nowakowski GS, et al. Metastatic malignant melanoma of the gastrointestinal tract. *Mayo Clin Proc* 2006;81:511–516.
- Panagiotou I, Brountzos EN, Bafaloukos D, et al. Malignant melanoma metastatic to the gastrointestinal tract. *Melanoma Res* 2002;12:169–173.
- Kovcin V, Josifovski J, Opric M. Gastric metastases of melanoma: two case reports. *Melanoma Res* 1998;8:90–91.
- Geboes K, De Jaeger E, Rutgeerts P, et al. Symptomatic gastrointestinal metastases from malignant melanoma. A clinical study. *J Clin Gastroenterol* 1988;10:64–70.
- Monti M, Guidoboni M, Oboldi D, et al. Melanoma metastasis mimicking gastric cancer: a challenge that starts from diagnosis. *Therap Adv Gastroenterol* 2021;14:1756284821989559.
- Chowdhury AAM, Khan MU, Hussain MM. Secondary metastatic gastric melanoma. *J Bangladesh Coll Phys Surg* 2021;39:68–75.
- Groudan K, Ma W, Joshi K. Metastatic melanoma presenting as a gastric mass. *Cureus* 2020;12:e11874.
- Rothschild PS, Subramaniam A, Chakrabarti R. Jaundice and haematemesis: an unusual presentation of metastatic malignant melanoma. *Cureus* 2020;12:e8035.
- Lee MW, Lee HJ. Numerous black elevations in the stomach and duodenum. *Am J Med Sci* 2020;360:78.
- Lim AH, Argyrides J. Gastrointestinal bleeding from metastatic melanoma. *N Engl J Med* 2020;382:e7.
- Voudoukis E, Mpitouli A, Giannakopoulou K, et al. Disseminated metastatic cutaneous melanoma to pancreas and upper gastrointestinal tract diagnosed by endoscopic ultrasound: an unusual case. *Clin J Gastroenterol* 2020;13:134–138.
- Okawa Y, Ebihara Y, Tanaka K, et al. Laparoscopic-assisted distal gastrectomy and central pancreatectomy for gastric and perigastric lymph node metastases and pancreatic invasion from melanoma: a case report. *Surg Case Rep* 2020;6:239.
- Jain A, Jaju A, Iyer M, et al. Metastases of malignant melanoma to

- stomach: an unusual presentation. *Indian J Pathol Oncol* 2020;7:480–482.
20. Sachdeva S, Dalal A, Kumar A, et al. Multifocal gastric metastasis of malignant melanoma: an ominous endoscopic appearance: gastric metastasis of malignant melanoma. *Dig Liver Dis* 2020;52:1512.
 21. Dinh B, Mossad D, Krishnamurthy P. S2953 Rare metastatic gastric melanoma causing iron deficiency anemia. *Am J Gastroenterol* 2020;115:S1552–S1553.
 22. Umeda Y, Tanaka K, Tsuboi J, et al. Small gastric metastases of malignant melanoma mimicking gastric erosion (with video). *Gastrointest Endosc* 2020;92:423–424.
 23. Shank CG, Mitchell N, Junga ZC, et al. A rare case of antemortem metastatic gastric and small intestine melanoma. *ACG Case Rep J* 2020;7:e00300.
 24. Januszewicz W, Corrie P, Liu H, et al. A sinister black finding in the stomach. *Lancet* 2019;393:1149.
 25. Santos-Seoane SM, Perez-Casado L, Helguera-Amezua C, et al. Metastatic melanoma of the stomach. *Cir Esp (Engl Ed)* 2019;97:51.
 26. Hussain S. Gastric and umbilical metastasis of cutaneous malignant melanoma. *Int J Innov Sci Res Technol* 2019;4:819–821.
 27. Morita S, Suda T, Terai S. Gastric metastasis from uveal melanoma. *Clin Gastroenterol Hepatol* 2019;17:A20.
 28. Masuda TS, Kuiu VA, dos Santos PH, et al. Gastric metastases of a malignant melanoma. *Clin Biomed Res* 2019;39:179–180.
 29. Rausei S, Pappalardo V, Boni L, et al. Laparoscopic intragastric resection of melanoma cardiac lesion. *Surg Oncol* 2018;27:642.
 30. Farshad S, Keeney S, Halalau A, et al. A case of gastric metastatic melanoma 15 years after the initial diagnosis of cutaneous melanoma. *Case Rep Gastrointest Med* 2018;2018:7684964.
 31. Falk V, Zepeda-Gomez S, Sultanian R, et al. Acute upper gastrointestinal bleeding in a patient with malignant melanoma. *BMJ Case Rep* 2018;2018:bcr2018225869.
 32. Borahma M, Essamri W, Afifi R, et al. Metastatic melanoma in the gastric body. *Austin J Gastroenterol* 2018;5:1093.
 33. Queiroz CA, Soares RH, de Andrade LP, et al. Gastric metastasis of malignant melanoma. *Rev Med Minas Gerais* 2017;27:e–1898.
 34. Iadevaia MD, Sgambato D, Miranda A, et al. Amelanotic metastatic melanoma of the stomach presenting with iron deficiency anemia. *Acta Gastroenterol Belg* 2017;80:327–328.
 35. Genova P, Sorce M, Cabibi D, et al. Gastric and rectal metastases from malignant melanoma presenting with hypochromic anemia and treated with immunotherapy. *Case Rep Oncol Med* 2017;2017:2079068.
 36. Hachiya M, Satoh K, Takami S, et al. A case of metastatic uveal melanoma of the liver and digestive tract. *Nihon Shokakibyō Gakkai Zasshi* 2017;114:1978–1986.
 37. Lee JS, Kim SJ, Kang DH, et al. The diagnosis of metastatic malignant melanoma incidentally found during a national health screening endoscopy: a case report. *Korean J Gastroenterol* 2017;70:103–106.
 38. Shustef E, Torres-Cabala CA, Curry JL, et al. Intraepithelial melanoma in the stomach after treatment with immune checkpoint blockade therapy. *Am J Dermatopathol* 2017;39:e116–e118.
 39. Grander LC, Cabral F, Lisboa AP, et al. Multiple cutaneous melanomas associated with gastric and brain metastases. *An Bras Dermatol* 2016;91(5 suppl 1):98–100.
 40. Hiramoto S, Kyogoku K. A case report of gastroduodenal metastasis from skin melanoma. *Nihon Shokakibyō Gakkai Zasshi* 2016;113:1001–1004.
 41. Cooper CJ, Mardini H. Gastrointestinal bleeding as the initial presentation of gastric melanoma metastasis. *Am J Gastroenterol* 2016;111:S1139–S1140.
 42. Wong K, Serafi SW, Bhatia AS, et al. Melanoma with gastric metastases. *J Community Hosp Intern Med Perspect* 2016;6:31972.
 43. Kuzu UB, Suna N, Gokcan H, et al. Metastases of malignant melanoma to stomach. *Prz Gastroenterol* 2016;11:54–55.
 44. Ozturk O, Basar O, Koklu S, et al. An unusual presentation of malignant melanoma: amelanotic gastric metastasis. *Am J Gastroenterol* 2015;110:476.
 45. Zhao L, Yan J, Li L, et al. Gastric metastasis from sphenoid sinus melanoma: a case report. *Oncol Lett* 2015;9:609–613.
 46. Eivazi-Ziaei J, Esmaili H. Metastatic malignant melanoma affecting stomach. *J Cancer Res Ther* 2014;10:733–736.
 47. Laskaratos FM, Gillmore R, Clark I, et al. Dark macules in the upper gastrointestinal tract: an ominous sign. *Dig Liver Dis* 2014;46:1133.
 48. Ruiz-Cuesta P, Hervás-Molina AJ, Villar-Pastor CM, et al. Metástasis gástrica tardia de melanoma cutáneo [Late gastric metastasis from cutaneous melanoma]. *Gastroenterol Hepatol* 2014;37:564–565.
 49. Rozsa A, Mellar E, Poczik S, et al. Gastrointestinal locations of primary melanoma. *Magy Seb* 2014;67:9–14.
 50. Mostafa MG, Hussein MR, El-Ghorory RM, et al. Gastric metastases from invasive primary mucosal epithelioid malignant melanoma of the hard palate: report of the first case in the English literature. *Expert Rev Gastroenterol Hepatol* 2014;8:15–19.
 51. Loganathan G, Singh P. Gastric malignant melanoma. *Indian J Gastroenterol* 2014;33:199.
 52. Shaaban H, Modi Y, Modi T, et al. Diffuse gastroduodenal metastasis from cutaneous malignant melanoma presenting as amelanotic “volcano-like” ulcers. *J Gastrointest Cancer* 2014;45:116–117.
 53. El-Sourani N, Troja A, Raab HR, et al. Gastric metastasis of malignant melanoma: report of a case and review of available literature.

- Viszeralmedizin 2014;30:273–275.
54. Suganuma T, Fujisaki J, Hirasawa T, et al. Primary amelanotic malignant melanoma of the small intestine diagnosed by esophago-gastroduodenoscopy before surgical resection. *Clin J Gastroenterol* 2013;6:211–216.
 55. Kraft Rovere R, Pires de Souza ME, Fernanda Hilgert S, et al. Melanoma metastasis to the gastric mucosa preceded by guillain-barré as a paraneoplastic syndrome. *Gastrointest Cancer Res* 2013;6:150–151.
 56. Crinò SF, Scalisi G, Pallio S, et al. Malignant melanoma rather than malignant cutaneous melanoma? *Eur J Gastroenterol Hepatol* 2013;25:503–506.
 57. Canhotoa M, Barbeiroa S, Arroja B, et al. Multiple gastric metastases of malignant melanoma. *GE Port J Gastroenterol* 2013;20:279–281.
 58. Rana SS, Chaudhary V, Bhasin DK. Narrow band imaging appearance of gastric metastasis from malignant melanoma. *Ann Gastroenterol* 2013;26:353.
 59. Li Z, Linghu E. One case report: endoscopic manifestation of gastric metastatic melanoma. *Am J Gastroenterol*. 2013;108: S603.
 60. Das HS, Panda C, Padhi S, et al. Endoscopic diagnosis of a case of malignant melanoma. *Trop Gastroenterol* 2012;33:296–297.
 61. Wu PR, Yen HH, Chen CJ. Gastrointestinal: primary esophageal melanoma with gastric metastasis. *J Gastroenterol Hepatol* 2011;26:1338.
 62. Kawaguti FS, Maluf-Filho F, Medeiros RS, et al. Ocular melanoma with multiple gastrointestinal metastases. *Dig Endosc* 2011;23:208.
 63. Goral V, Ucmak F, Yildirim S, et al. Malignant melanoma of the stomach presenting in a woman: a case report. *J Med Case Rep* 2011;5:94.
 64. Bahat G, Saka B, Colak Y, et al. Metastatic gastric melanoma: a challenging diagnosis. *Tumori* 2010;96:496–497.
 65. Kasza J, Espinel F, Khambaty F, et al. Laparoscopy for stage IV melanoma in two organs. *Surg Laparosc Endosc Percutan Tech* 2010;20:295–297.
 66. Matsubayashi H, Takizawa K, Nishide N, et al. Metastatic malignant melanoma of the gastric mucosa. *Intern Med* 2010;49:1243–1244.
 67. Carneiro JQ, Landim MR, Mendes JV, et al. Metastatic gastric melanoma: case report. *Rev Soc Bras Clin Med* 2010;8:461–463.
 68. Slattery E, O'Donoghue D. Metastatic melanoma presenting 24 years after surgical resection: a case report and review of the literature. *Cases J* 2009;2:189.
 69. Padhi S, Kar A, Behera PK, et al. Occult malignant melanoma metastasizing to the stomach in an elderly patient. *Indian J Pathol Microbiol* 2008;51:461–462.
 70. Koklu S, Gultuna S, Yuksel I, et al. Diffuse gastroduodenal metastasis of conjunctival malignant melanoma. *Am J Gastroenterol* 2008;103:1321–1323.
 71. Alghisi F, Crispino P, Cocco A, et al. Morphologically and immunohistochemically undifferentiated gastric neoplasia in a patient with multiple metastatic malignant melanomas: a case report. *J Med Case Rep* 2008;2:134.
 72. Erzin Y, Akyuz U, Pata C. What is your diagnosis? Small black spots in the stomach and duodenum. *Neth J Med* 2008;66:129–131.
 73. Bargiggia S, Parente F, Ucci G, et al. Bleeding gastric metastatic melanoma. *Dig Liver Dis* 2008;40:699.
 74. Pommer B, Probst A, Messmann H. Gastric metastases from malignant melanoma. *Endoscopy* 2008;40 Suppl 2:E30–E31.
 75. Parisian KR, Mcfarland JE, Shah AN. Metastatic malignant melanoma of the gastrointestinal tract. *Clin Gastroenterol Hepatol* 2008;6:A24–A24.e1.
 76. Rocha ME, Rodrigues GP, Borges SA, et al. Metastatic melanoma of the stomach. *ABCD Arq Bras Cir Dig* 2008;21:205–207.
 77. Cohen VM, Ahmadi-lari S, Hungerford JL. Gastric metastases from conjunctival melanoma. *Melanoma Res* 2007;17:255–256.
 78. Prado AB, Vargas SF, Clemente LJ. Gastric metastasis of cutaneous melanoma. *Gastroenterol Latinoam* 2007;18:35–38.
 79. Lufano M, Storch I, Feldstein R, et al. Metastatic melanoma in a dialysis patient with vomiting diagnosed by gastric polyp biopsy. *Am J Gastroenterol* 2007;102:S343.
 80. Ueno N, Yoneda M, Inamori M, et al. Metastatic malignant melanoma in the upper alimentary tract. *Gastrointest Endosc* 2006;64:1002; discussion 1003.
 81. Benedeto-Stojanov DA, Nagorni AV, Zivkovic VV, et al. Metastatic melanoma of the stomach and the duodenum. *Arch Oncol* 2006;14:60–61.
 82. Fink W, Zimpfer A, Ugurel S. Mucosal metastases in malignant melanoma. *Onkologie* 2003;26:249–251.
 83. Mimica M, Tomic I. Endoscopic diagnosis of malignant melanoma metastatic to the stomach. *Am J Gastroenterol* 2002;97:1572–1573.
 84. Hokama A, Sugama R, Kinjo F, et al. At the focal point...metastatic malignant melanoma. *Gastrointest Endosc* 1999;50:241.
 85. Woollons A, Derrick EK, Price ML, et al. Gastrointestinal malignant melanoma. *Int J Dermatol* 1997;36:129–131.
 86. Hsu CC, Chen JJ, Changchien CS. Endoscopic features of metastatic tumors in the upper gastrointestinal tract. *Endoscopy* 1996;28:249–253.
 87. Klausner JM, Skornick Y, Lelcuk S, et al. Acute complications of metastatic melanoma to the gastrointestinal tract. *Br J Surg* 1982;69:195–196.
 88. Morini S, Bassi O, Colavolpe V. Malignant melanoma metastatic to the stomach: endoscopic diagnosis and findings. *Endoscopy* 1980;12:86–89.

89. Bäckman H, Davidsson L. Metastases of malignant melanoma in the stomach and small intestine. *Acta Med Scand* 1965;178:329–335.
90. Reed PI, Raskin HF, Graff PW. Malignant melanoma of the stomach. *JAMA* 1962;182:298–299.
91. McLaughlin CC, Wu XC, Jemal A, et al. Incidence of noncutaneous melanomas in the U.S. *Cancer* 2005;103:1000–1007.
92. Bishop KD, Olszewski AJ. Epidemiology and survival outcomes of ocular and mucosal melanomas: a population-based analysis. *Int J Cancer* 2014;134:2961–2971.
93. Tas F, Keskin S, Karadeniz A, et al. Noncutaneous melanoma have distinct features from each other and cutaneous melanoma. *Oncology* 2011;81:353–358.
94. Pomerantz H, Margolin HN. Metastases to the gastrointestinal tract from malignant melanoma. *Am J Roentgenol Radium Ther Nucl Med* 1962;88:712–717.
95. Potchen EJ, Khung CL, Yatsunami M. X-ray diagnosis of gastric melanoma. *N Engl J Med* 1964;271:133–136.
96. Nelson RS, Lanza F. Malignant melanoma metastatic to the upper gastrointestinal tract: endoscopic and radiologic correlations, form and evolution of lesions, and value of directed biopsy in diagnosis. *Gastrointest Endosc* 1978;24:156–158.
97. Oda I, Kondo H, Yamao T, et al. Metastatic tumors to the stomach: analysis of 54 patients diagnosed at endoscopy and 347 autopsy cases. *Endoscopy* 2001;33:507–510.
98. Gilg MM, Grochenig HP, Schlemmer A, et al. Secondary tumors of the GI tract: origin, histology, and endoscopic findings. *Gastrointest Endosc* 2018;88:151–158.e1.
99. Booth JB. Malignant melanoma of the stomach: report of a case presenting as an acute perforation and review of the literature. *Br J Surg* 1965;52:262–270.
100. Haendchen Bento L, Kazuyoshi Minata M, Pires Batista C, et al. Clinical and endoscopic aspects of metastases to the gastrointestinal tract. *Endoscopy* 2019;51:646–652.