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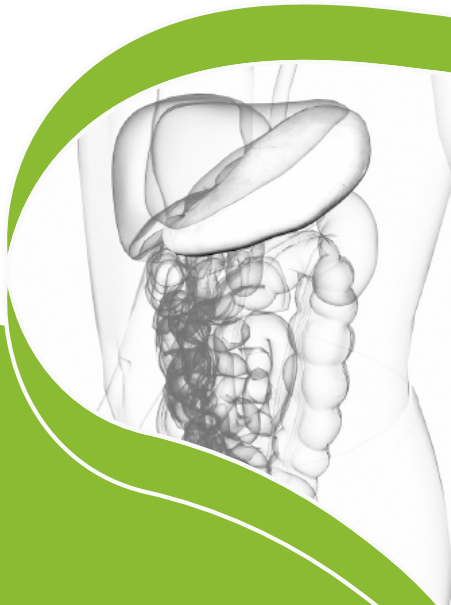

Official Body of Sociedad Andaluza de Patología Digestiva

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AUTHOR STANDARDS **2025**

1. RAPD Objectives and characteristics: The Revista Andaluza de Patología Digestiva is the official publication of the Andalusian Society of Digestive Pathology (SAPD), which since 2007 has been published in electronic format only, under the name RAPD Online. Its purpose is to disseminate all epidemiological, clinical, basic and sociological aspects of digestive diseases, through the contributions sent to the journal from Andalusia and from the entire scientific community. The official language for the publication of this journal is Spanish, but some contributions may be accepted in the author's original language in English, French or Italian. RAPD Online is published bimonthly, with one of the issues being specially dedicated to the Annual Meeting of the SAPD and the Editorial Board deciding to reserve one or more issues per year for the monographic development of a topic related to the speciality.

All submitted contributions must be original and not be simultaneously under review for publication in another journal. The publication of abstracts or posters is not considered duplicate publication. Manuscripts will be evaluated by expert reviewers, appointed by the editorial board, before being accepted for publication, in a process that will take less than 30 days.

2. RAPD Contents: *regular numbers of RAPD Online include defined sections such as:*

- *Original articles on clinical or basic research.*
- *Thematic reviews on specific aspects of Gastroenterology.*
- *Consensus documents.*
- *Clinical cases.*
- *Clinical cases with videos or Videoforum.*
- *Images of the month.*
- *News and updates on gastroenterology and hepatology.*
- *Letters to the Editor.*

Other contributions that are considered of interest by the Editorial Board, relating to different aspects of clinical practice in the recent past, biographical comments, or other contents of a cultural nature, or related to scientific activities in any territorial area, will be inserted in RAPD Online in sections designed specifically for this purpose.

3.Submission of manuscripts: *The preferred way to submit manuscripts is through the SAPD website (https://www.sapd. es), by accessing the RAPD Online page and clicking on the "Submit an original" button located on the same access page to the journal. This will take you to the Manuscript Centre, from where you will be able to send manuscripts and all the required documentation. To use this tool you must be previously registered, access requires a username and password. If you are a member of the SAPD, you can use your usual username. If you are not a member, you can request a username for access to the Manuscript Centre using the form on the website. You can write to sulime@sulime.net or RAPDonline@sapd.es, for the solution of any problem in the submission of manuscripts.*

4. Writing standard for manuscripts: *monographic numbers, thematic reviews, updates and annotated articles will be commissioned by the Editorial Board, but the submission of any of these contributions at the request of an author will be considered by the RAPD Online Management and evaluated with great interest for inclusion in the journal.*

All manuscripts will be subject to specific rules, depending on the type of contribution, and to common ethical and legal standards.

A) Specific standard for manuscripts writing

They refer to the recommended length and structure of each type of manuscript. As a basic unit of length for the text, in any of the contributions, a page of 30-31 lines, spaced 1.5 lines apart, with a font size of 12, with 75-80 characters without spaces per line and a total of 400-450 words per page is considered. Texts should be sent spell-checked and in editable format in all their applications (main text, figures, legends or figure captions, tables, graphs, drawings).

Originals: *originals can be up to 12 pages long (5,100 words), excluding bibliographical references and captions to figures and tables. It is not advisable to insert more than 10 images, including tables and figures. Colour illustrations and videos will not represent an economic charge for the authors, but the insertion of videos, for technical reasons, will be previously agreed with the editor. However, the editing method of RAPD Online allows, in specific cases, the acceptance of longer manuscripts, or the inclusion of a greater number of images, provided that the characteristics of the material presented so require. It is not advisable to have more than 9 authors, except in the case of collaborative works. In these originals, the first nine participants will be listed at the head of the paper and the rest of the participants will be listed at the end of the first page of the manuscript.*

Through the Manuscript Centre, the following information will be required for the submission of an original:

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4° Full postal address of the responsible author, to whom correspondence should be addressed, including telephone, fax and email address.
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- Main body of the manuscript, containing:

1° Structured abstract in Spanish (optional also in English) and 3-5 keywords. The abstract will have a maximum length of 250 words and should be structured as follows:

a) Introduction and objectives
b) Material and methods
c) Results
d) Conclusions

2° List of abbreviations used in the text.

3° Text: it will include the following sections:
a) Introduction
b) Material and methods
c) Results

d) Discussion
e) Conclusions; each of them appropriately headed.

4° Bibliography: according to the specifications established in the group of common standards (See common standards and other supporting documents).

5° Acknowledgements.

6° Figure captions.

7° Tables and figures in text.

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1° Structured abstract in Spanish and English. 3-5 key words. The abstract will have a maximum length of 350 words, emphasising the most important aspects of the manuscript.
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3° Centre(s) of origin (department, institution, city and country).
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5° Declaration on the existence or non-existence of a source of funding for the work, or conflicts of interest.

- Main body of the manuscript, containing:

1° Structured abstract in Spanish and English. 3-5 key words. The abstract will have a maximum length of 350 words, emphasising the most important aspects of the manuscript.
2° Text: Structured according to the criteria of the author(s), for a better understanding of the topic developed.
3° Bibliography: According to the specifications established in the group of common standards (See common standards and other supporting documents).
4°Acknowledgements
5° Figure captions.
6° Tables and Figures in the text.

Clinical Cases: *the manuscripts included in this section will include 1-5 clinical cases, which due to their infrequent or unusual clinical behaviour, or because they provide some diagnostic or therapeutic novelty, deserve to be reported.*

The length of the texts in the Clinical Cases section should not exceed 5 pages (2,125 words), excluding bibliographical references and captions to figures and tables, and the number of inserted images should not exceed 5, including tables and figures. However, the RAPD Online editing method allows, in specific cases, the acceptance of longer manuscripts, or the inclusion of a greater number of images, provided that the characteristics of the material presented so require. Colour illustrations and videos will not represent a financial charge for authors, but the insertion of videos, for technical reasons, will be previously agreed with the editor. No more than 5 authors will be admitted, except in specific and reasoned cases.

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4° Full postal address of the responsible author, to whom correspondence should be addressed, including telephone, fax and e-mail address.

- Main body of the manuscript, containing:

1° Structured abstract in Spanish and English. 3-5 key words. The abstract will have a maximum length of 250 words.
2° Introduction. To present the clinical problem reported.
3° Description of the clinical case.
4° Discussion. To highlight the peculiarities of the case and its consequences.
5° Bibliography: According to the specifications established in the group of common standards (See common standards and other supporting documents).
6°Acknowledgements.7° Figure captions.
8° Tables and text figures.

Clinical Cases with Videos or Videoforum: *the manuscripts included in this section will include 1-5 clinical cases, which due to their infrequent or unusual clinical behaviour, or because they provide some diagnostic or therapeutic novelty, deserve to be communicated.*
The length of the texts in the Videoforum section should not exceed 5 pages (2,125 words), excluding bibliographical references and captions to figures and tables, and the number of images inserted should not exceed 5, including tables and figures. However, the RAPD Online editing method allows, in specific cases, the acceptance of longer manuscripts, or the inclusion of a greater number of images, provided that the characteristics of the material presented so require. Colour illustrations and videos will not represent a financial charge for authors, but the insertion of videos, for technical reasons, will be previously agreed with the editor. No more than 5 authors will be admitted, except in specific and reasoned cases.

Videos should be submitted in AVI, MPEG, MP4 OR MOV format, and at a recommended high quality resolution (720p or 1080p). They must not contain personal data of the patients. It is recommended that they be edited to minimise editing time, which should not exceed 10 minutes. If the video includes sound, it must be processed in MP3 format. If the videos to be included are in other formats, please contact the publisher

to verify their validity. They should not exceed 2GB.
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3° Centre(s) of origin (department, institution, city and country).
4° Full postal address of the responsible author, to whom correspondence should be addressed, including telephone, fax and email address.

- Main body of the manuscript, containing:

1° Structured abstract in Spanish and English. 3-5 key words. The abstract will have a maximum length of 250 words.
2° Introduction. To present the clinical problem reported. 3° Description of the clinical case.
4° Discussion. To highlight the peculiarities of the case and its consequences.
5° Bibliography: According to the specifications established in the group of common standards (See common standards and other supporting documents).
6°Acknowledgements.7° Figure captions.
8° Tables and figures in text.
9° Videos.

Link tutorial videos: https://www.sapd.es/videoteca/varios/ tutoriales/

Images of the month: *the manuscripts included in this section can take two formats, depending on the authors' preference.*

- Format A. Images with educational value: these shall include images of any kind, clinical, radiological, endoscopic, anatomopathological, macro and microscopic, which contribute to postgraduate training and therefore deserve to be shown because of their peculiarity, or because they represent a characteristic example.
- Format B. Key images for a diagnosis: These will include images of any kind, clinical, radiological, endoscopic, anatomopathological, macro and microscopic, together with a summarised clinical history, which will provide the possible final diagnostic resolution. This will be presented in a separate section in the same issue of the journal.

The length of the texts in the Images of the Month section must not exceed 1 page (425 words) in the clinical approach to the image presented and 2 pages (850 words), excluding bibliographical references and captions to figures and tables, in the commentary on the image (Format A) or in the diagnostic resolution of the case (Format B). However, the RAPD Online editing method allows, in specific cases, the acceptance of longer manuscripts, or the inclusion of a greater number of images, provided that the characteristics of the material presented so require. Colour illustrations and videos will not represent a financial charge for authors, but the insertion of videos, for technical reasons, will be previously agreed with the editor. No more than 3 authors will be accepted, except in specific and reasoned cases.

Through the Manuscript Centre, and for the submission of an Image of the Month, the following information will be required:

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1° Full title of the work in Spanish and English.. 2° Surnames and first names of all authors.
3° Centre(s) of origin (department, institution, city and country).
4° Full postal address of the responsible author, to whom correspondence should be addressed, including telephone, fax and email address.
5° Type of Image of the Month format chosen.

-Main body of the manuscript, containing:

1° Structured abstract in Spanish and English and 3-5 key words. The abstract will have a maximum length of 250 words.
2° Description of the image.
3° Comments on the image.
4° Bibliography: According to the specifications established in the group of common standards (See common standards and other supporting documents).
5° Figure captions.

New developments and updates in gastroenterology and hepatology: this section will be devoted to commenting on the scientific and medical developments that have occurred in recent years in the speciality of Gastroenterology and Hepatology.

This section will systematically and periodically analyse all facets of the speciality.

Texts on " New developments in Gastroenterology" may be up to 5 pages long (2,125 words), excluding bibliographical references and captions to added figures and tables. In both cases the number of inserted images must not exceed 5, including tables and figures. However, the RAPD Online editing method allows,

in specific cases, the acceptance of longer manuscripts, or the inclusion of a greater number of images, provided that the characteristics of the material presented so require. It is not advisable to have more than 3 authors per chapter.

Through the Manuscript Centre, you will be asked to provide the following information:

- General data:

1° Name of the bibliographic area reviewed and period analysed 2° Surname and first name of all authors. It is advisable to place a hyphen between the first and second surname.
3° Centre(s) of origin (department, institution, city and country).
4° Full postal address of the responsible author, to whom correspondence should be addressed, including telephone, fax and email address.
5° Declaration on the existence or non-existence of a source of funding for the work, or conflicts of interest.

- Main body of the manuscript, containing:

1° Structured abstract in Spanish and English. 3-5 key words. The abstract will have a maximum length of 250 words.
2° Description of the bibliographic material analysed.
3° Critical comments on the results contained in the selected works.
4° Bibliography: According to the specifications established in the group of common standards (See common standards and other supporting documents). If two or more originals have been chosen for the analysis, it is advisable to divide the section into sections at the authors' discretion.
5° Figure captions.
6° Tables and Figures in text.

Letters to the Editor: *this section will be dedicated to comments on any manuscript published in RAPD Online. This section may also include comments of a more general nature, establishing the authors' own hypotheses and suggestions, within the scientific field of Gastroenterology. The length of the texts in this section of Letters to the Editor should not exceed 2 pages (850 words), including bibliographical references. Two figures or tables may be included and the number of authors should not exceed four.*

Through the Manuscript Centre, and for the submission of a Letter to the Editor, the following information will be required:

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2° Surnames and first names of all authors. It is advisable to place a hyphen between the first and second surname.
3° Centre(s) of origin (department, institution, city and country).
4° Full postal address of the responsible author, to whom correspondence should be addressed, including telephone, fax and e-mail address.
5° Declaration on the existence or non-existence of a source of funding for the work, or conflicts of interest.

- Basic body of the manuscript, containing:

1° Text of the manuscript.
2° Bibliography: According to the specifications set out in the common standards group (See common standards and other supporting documents).

B)Common standards and other supporting documents

This refers to the set of mandatory standards, both for uniformity in the presentation of manuscripts and for compliance with current legal regulations. In general, the style of manuscripts should follow the guidelines set out in the Vancouver Agreement of the International Committee of Medical Journal Editors. (http://www.ICMJE.org).

Units, generic names and abbreviations:

- Units. Biochemical and haematological parameters shall be expressed in International Units (SI), except haemoglobin which shall be expressed in g/dL. Length, height and weight measurements shall be expressed in decimal metric units and temperatures in degrees Celsius. Blood pressure shall be measured in millimetres of mercury.
There is an aid for the conversion of non-international (non-SI) units into international (SI) units. (http://www.techexpo.com/techdata/techcntr.html).

- Generic names. The generic names of medicinal products, clinical instruments and tools and software shall be used. When a brand name is the subject of research, the brand name and the name of the manufacturer, city and country shall be included in parentheses the first time the generic name is mentioned in the Methods section.

- Abbreviations. Abbreviations should be avoided, but if they have to be used, in order not to repeat long technical names, the full word should appear the first time in the text, followed by the abbreviation in brackets, which will already be used in the manuscript.

Bibliographical references: bibliographical references should be presented in the order in which they appear in the manuscript, with a sequential number, which will appear in the appropriate place in the text, in brackets. This numbering will be maintained and will serve to order the list of all references at the end of the manuscript, as normal text and never as a footnote. Personal communications and unpublished data will not be included in the final list of bibliographical references, although they will be mentioned in the appropriate place in the text, in brackets, as appropriate, i.e. personal communication or unpublished data. When the bibliographic citation includes more than 6 authors, the first 6 authors should be cited, followed by the abbreviation et al.

The style of bibliographic references will depend on the type and format of the source cited:

- Medical journal article: journal names should be abbreviated according to the style of the Index. Medicus/Medline (http://www.ncbi.nlm.nih.gov/journals?itool=sidebar).

- Article already published in print and online journals Internet:
The authors (surname and initial of the first name, comma separation between authors), the full name of the manuscript, the abbreviation of the journal, the year of publication and after a semicolon the volume of the journal and after a colon the complete numbers of the first and last page of the paper.

Kandulsky A, Selgras M, Malfertheiner P. Helicobacter pylori infection: A Clinical Overview. Dig Liver Dis 2008; 40:619-626.

Alvarez F, Berg PA, Bianchi FB, Bianchi L, Burroughs AK,Cancado EL, et al. International Autoimmune Hepatitis Group Report: review of criteria for diagnosis of autoimmune hepatitis. J Hepatol 1999; 31:929-938.

- Admitted article, published only on the Internet, but not yet included in a regular number of the journal: the authors, the full name of the manuscript, the abbreviation of the journal, the year and month since the article is available on the Internet and DOI will be noted. The original paper to which reference is made usually details how to cite the manuscript.

Stamatakos M, Sargedi C, Stefanaki C, Safi oleas C, Matthaiopoulou I, Safi oleas M. Anthelminthic treatment: An adjuvant therapeuticstrategy against Echinococcus granulosus. Parasitol Int (2009), doi:10.1016/j.parint.2009.01.002

Inadomi JM, Somsouk M, Madanick RD, Thomas JP, Shaheen NJ. A cost-utility analysis of ablative therapy for Barrett'sesophagus, Gastroenterology (2009), doi: 10.1053/j.gastro.2009.02.062.

- Article from a journal that is published only on the Internet, but arranged in a conventional way: the authors, the full name of the manuscript, the abbreviation of the journal (can be added in brackets online), the year of publication and after a semicolon the volume of the journal and after a colon the complete numbers of the first and last page of the paper. If the original work being referenced provides the DOI and Internet address (URL), these can be added at the end of the reference.

Gurbulak B, Kabul E, Dural C, Citlak G, Yanar H,Gulluoglu M, et al. Heterotopic pancreas as a leading point for small-bowel intussusception in a pregnant woman. JOP (Online) 2007; 8:584-587.

Fishman DS, Tarnasky PR, Patel SN, Raijman I. Managementof pancreaticobiliary disease using a new intra-ductal endoscope: The Texas experience. World J Gastroenterol 2009; 15:1353-1358. Available from: URL: http://www.wjgnet.com/1007-9327/15/1353.asp. DOI: http://dx.doi.org/10.3748/wjg.15.1353

- Article from a journal that is published only on the Internet, but is not conventionally arranged: the authors, the full name of the manuscript, the abbreviation of the journal, the year of publication and the DOI will be listed.

Rossi CP, Hanauer SB, Tomasevic R, Hunter JO, Shafran I, Graffner H. Interferon beta-1a for the maintenance of remission in patients with Crohn's disease: results of a phase II dose-finding study.BMC Gastroenterology 2009, 9:22doi:10.1186/1471-230X-9-22.

-Article published in an abstract or in a supplement of a journal: the authors (surname and first initial, separated by commas between authors), the full name of the manuscript, the word abstract in square brackets, the abbreviation of the journal, the year of publication and after a semicolon the volume of the journal, followed by the abbreviation Suppl, or Supl, in brackets and after a colon the complete numbers of the first and last page of the paper.

Klin M, Kaplowitz N. Differential susceptibility of hepatocytesto TNF-induced apoptosis vs necrosis [Abstract]. Hepatology 1998; 28(Suppl):310A.

- Books: the authors of the book (surname and first initial, comma separated by the authors), the title of the book, the city where it was published, the name of the publisher and the year of publication will be listed.

Takada T. Medical Guideline of Acute Cholangitis and Cholecystitis. Tokyo: Igaku Tosho Shuppan Co; 2005.

- Chapter of a book: the authors of the chapter should be listed (surname and first initial, separated by commas between authors), followed by In: the names of the editors of the book and, after a full stop, the name of the book. The city where it was published, the name of the publisher, the year of publication and after a colon the complete numbers of the first and last page of the work.

Siewert JR. Introduction. In: Giuli R, Siewert JR, Couturier D, Scarpignato C, eds. OESO Barrett's Esophagus. 250 Questions. Paris: Hors Collection, 2003; 1–3.

- Information from a document produced at a meeting: this type of reference should be avoided whenever possible. However, if it has to be cited, the title of the subject, the name of the meeting and the city where it was held should be given. The entity that organised the meeting, and the year. The e-mail address through which the document can be accessed.

U.S. positions on selected issues at the third negotiating session of the Framework Convention on Tobacco Control. Washington, D.C.: Committee on Government Reform, 2002. (Accessed March 4, 2002, at:http://www.house.gov/reform/min/inves_tobacco/index_accord. htm.)

Figures, tables and videos: iconography, whether photographs, radiographs, diagrams or graphs, should be referred to under the generic name of "Figure". References to figures, tables and videos should be highlighted in bold. They should be numbered with Arabic numerals, according to their order of appearance in the text. Panels of two or more photographs grouped together will be considered as a single figure and may be referred to as "Figures 1A, 1B, 1C".

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Endoscopic images and other techniques generating colour images, if not directly available in electronic format, shall be scanned in colour. Special details shall be indicated by arrows, using for these and any other type of symbols the maximum contrast plot with respect to the figure.

Figure files will be identified according to their order of appearance in the text, with the name of the file, its number and surname of the first signatory (e.g.: fig1_Gómez.jpg) or the title of the article. Each image must have an associated figure caption that serves as a description. Figure captions must be submitted in a separate text document with clear reference to the figures to which they refer. Images may be inserted in Word/PowerPoint files to facilitate their identification or association with the figure captions, but they must always be submitted as separate images in the formats mentioned above.

Photographs of patients must not make them unidentifiable. If it is not possible to obtain them, the publication of the photograph must be accompanied by written permission (Model Photograph Permission Form).

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- The P must be used in capital letters, reflecting the exact value and expressions such as less than 0.05, or less than 0.0001 should be avoided.
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REVIEW ARTICLE

WHAT DOES STATIONARY AND AMBULATORY IMPEDANCE TESTING CONTRIBUTE TO CLASSICAL MEASUREMENT TECHNIQUES?

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Abstract

Impedanciometry is a technique described decades ago, but its use is not widely adopted today. However, its utility has been extensively demonstrated in multiple studies, both as a diagnostic support during high-resolution esophageal manometry and in outpatient settings coupled with pH monitoring. Additionally, it aids in the diagnosis of conditions that have very low visibility and can be used as a tool for optimizing both medical and surgical treatments.

In this review, we will discuss its current indications as well as future perspectives. We will also explore its use in conjunction with high-resolution esophageal manometry, as well as the studies of impedance manometry and 24-hour pH monitoring. We will highlight the conditions where its use makes a significant difference for diagnosis and follow-up, and finally, we will examine the values and indices that are currently in use and under development.

Keywords: esophageal impedanciometry, planimetry, high-resolution esophageal manometry, ambulatory esophageal impedanciometry.

Introduction

Multichannel intraluminal impedance testing is a technique that was developed in 1990 at the Helmholtz Institute in Aachen (Germany) and was first described by Silny[1] who studied the movement of the intraluminal bolus by measuring changes in the conductivity of the contents. Its use was approved by the Food and Drug Administration (FDA) in 2002. The fundamental basis of this technique is that it allows us to detect the direction of movement of the oesophageal intraluminal bolus without the use of ionising radiation.

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The review of this topic is divided into:

1.- Concept and basic graph

2.-Indications:

- Impedance associated with High Resolution Manometry (HRIM)
  - a. Supragastric belching and rumination
  - b. Achalasia
  - c. Other
- Impedance coupled to 24-hour pHmetry.
  - a. Hypersensitive oesophagus
  - b. Functional pyrosis

3.- Conclusion

Concept and basic graph

Impedance testing measures the greater or lesser resistance to electrical current between two metal electrodes included in the high resolution oesophageal manometry catheter. It is the opposite of conductivity. This resistance will increase according to the oesophageal content, independently of the oesophageal pH. Its fundamental unit is the Ohm (Ω).

Thus, depending on the oesophageal content, we will have a graph with a fall or rise in the impedancemetry, which will indicate the direction. Air has a high impedance (10,000 Ω), while saline has a low impedance (100 Ω). Therefore, this test should be performed with saline swallows whose impedance is known and easily recognisable on the graphs. The resting state of the oesophagus shows the impedance values of its mucosa[2].

The basic graph to recognise when swallowing is as follows (Figure 1)[3]:

- First there is a rise above the basal line which corresponds to the air that we swallow together with the food bolus.
- Then the impedance drop due to the arrival of the bolus in the canal is recorded, which should be at least 50% above the baseline.
- Finally, recovery of the basal levels takes place.

This occurs in each of the channels located in the tube so that if we look at the direction of the fall or rise we can identify both the type of oesophageal intraluminal contents and its direction.

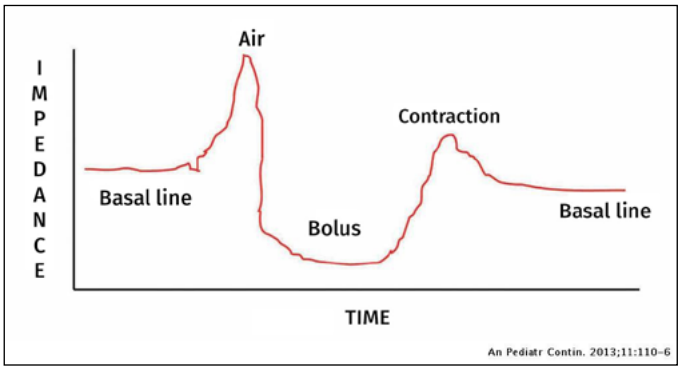

Figure 1. ***Impedance graph during a saline swallow[3].***

The antegrade movement of the bolus that occurs during swallowing produces a fall in impedance from proximal to distal and subsequently produces the peristaltic wave that we see on oesophageal manometry recordings as usual.

In contrast, retrograde movement of the bolus, which implies a reflux or regurgitation episode, is reflected as an impedance drop from distal to proximal. Esophageal clearance is then observed with a drop from proximal to distal and a corresponding peristalsis wave (Figure 2)[3].

If the content is air, instead of a drop in impedance we would observe a rise in impedance.

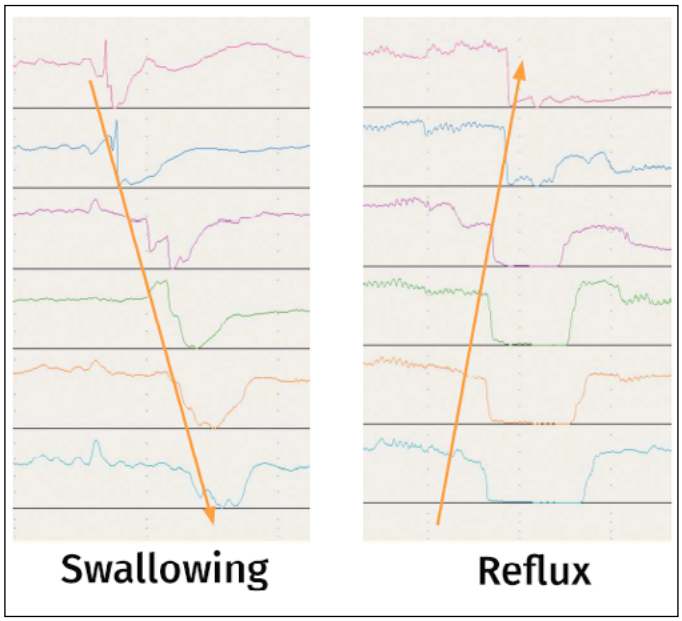

Figure 2. ***Swallow and reflux type image[3].***

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However, it should be noted that this technique is very sensitive to small changes in both liquid and gas volumes. It is therefore not possible to estimate the amount of intraluminal fluids as it has been found that the drop is similar with amounts of 1 and 10 ml.

Artefacts, movements on the baseline due to the movement of the catheter, also occur during the study. It is important to be aware of these artefacts and know how to identify them in order to avoid misdiagnosis.

Indications (Table 1)

Coupled to high-resolution manometry (HRIM):
a)To assess antegrade and retrograde movement in the diagnosis of gastric/supra-gastric belching and rumination syndrome.
b)To assess the level of oesophageal retention as a substitute for a timed barium oesophagogram in achalasia, especially after treatment.
c)Impedance planimetry system (Endoflip) to assess adequate distensibility in both the oesophageal body and oesophageal-gastric junction.
24-hour oesophageal impedance measurement (IMM-pH) to assess non-acid reflux.
a) In patients with heartburn or regurgitation not responding to twice-daily intensified proton pump inhibitors.
b) In patients with chest pain, throat or respiratory symptoms in whom gastro-oesophageal reflux disease is suspected, non-responders to double dose.
c) Evaluation of patients with normal acid exposure, but increased episodes of non-acid reflux and/or an association between non-acid reflux and symptoms, increasing the number of patients suitable for anti-reflux surgery.
d) Patients with recurrent or persistent reflux symptoms after anti-reflux surgery as this may confirm or reject the persistence of gastro-oesophageal reflux and exclude other causes of symptoms, such as supra-gastric belching.

Table 1. ***Indications for impedance testing***

The indications for impedance testing are under continuous review and study. They are currently well established in the following cases [4]:

- Coupled with high-resolution manometry (HRIM):

a. To evaluate antegrade and retrograde movement in the diagnosis of gastric/supragastric belching and rumination syndrome.

b. To assess the level of oesophageal retention as a substitute for a timed barium oesophagogram in achalasia, especially after treatment.

c. Impedance planimetry system (Endoflip) to assess adequate distensibility in both the oesophageal body and oesophageal-gastric junction.

- 24-hour oesophageal impedance measurement (IMM-pH) to assess non-acid reflux.

There are other indications whose bases are not as widespread but which are commonly used in centres where the technique is available, such as[4]:

- Assessment of oesophageal bolus retention.

- HRIM to assess bolus transit in relation to peristaltic integrity, using the criteria of effective vs. ineffective and the importance of peristaltic ruptures.

- Automated analysis of impedance impedance measurement for the assessment of bolus transit in non-obstructive dysphagia.

- HRIM with videofluoscopy to model the phases of bolus transit and intrabolus pressure classification.

Impedance coupled with high-resolution oesophageal manometry (HRIM)

This is an improvement on the basic technique, because in addition to providing information on oesophageal motor alterations, it allows us to know the functional component. In other words, it tells us what oesophageal transit is like. For this purpose, the usual protocol of the manometric study is followed, but taking into account that swallows must be performed with saline (0.9%). In figure 3, a normal recording can be observed with complete clearance of the esophageal contents (purple color).

Its use is already contemplated in the Chicago Classification version 4 published in 2020[5], where it is recommended (although it is not considered essential) to assess intra-bolus pressure, oesophageal clearance and bolus flow through the oesophagogastric junction. This is because there are patients who, despite the clinical manifestations they refer to us, we do not obtain a diagnosis after performing our manometric tests, and this occurs because the functional component is not taken into account. This occurs

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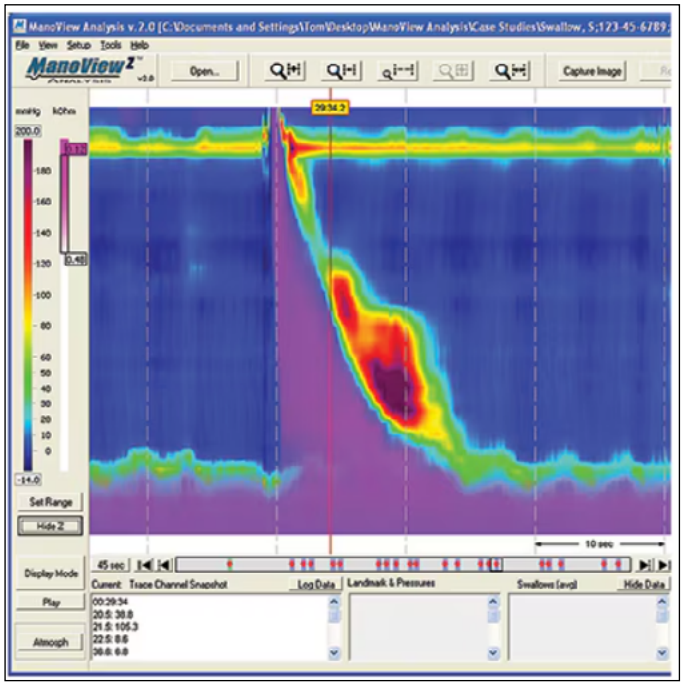

Figure 3. ***Swallowing record with normal impedance testing.***

mainly in rumination disorders and supragastric belching.

These functional pathologies are often underdiagnosed because they cannot be demonstrated by any objective test.

a. Supragastric belching and rumination

During further study of the graphs we can clearly differentiate gastric belching from supragastric belching (Figure 4)[6].

Rumination is a functional disorder defined by voluntary regurgitation of recently ingested food, followed by re-chewing and swallowing, or expulsion from the mouth. It is not preceded by nausea or straining and ends when the regurgitated material becomes acidic. It is seen in up to 2% of the adult population. There are three types. Primary rumination and secondary rumination, associated with gastro-oesophageal reflux or supragastric belching. Classically, the diagnosis is made in the consultation room, but this requires a very detailed history and a very clear explanation by the patient of the episodes, which is sometimes very difficult to obtain. This is why impedance enables us to observe the episodes as they occur and to obtain a very clear record. Its treatment is far from the drugs that would be used to treat gastro-oesophageal reflux, so these patients are often treated chronically with proton pump inhibitors (PPIs) without this resolving their underlying pathology[6,7]. Definitive treatment, as in the case of supragastric belching, is behavioural with diaphragmatic breathing techniques[8]. In these cases the examination should be performed in a different way. A standardised meal should be provided at the end of the normal recording with solids. Then the postprandial period should be recorded, which is where the episodes usually occur. Thus, in the case of rumination, an increase in intragastric pressure preceding normal swallowing is observed. This, in a normal recording, can be confused with episodes of regurgitation[9].

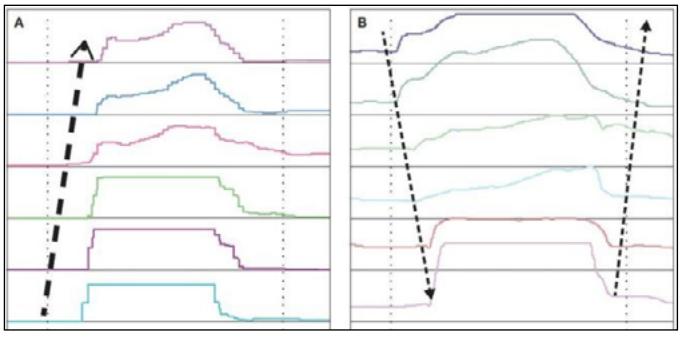

Figure 4. ***Diagnosis of gastroesophageal burp vs. supragastric burp.***

b. Achalasia

This is a very relevant pathology in our motility units. Its clear diagnosis and, above all, its treatment are a challenge. The patient's quality of life and possible long-term complications require that, whether we decide on oesophageal dilatation or oesophageal myotomy, the result should be as precise as possible. The gastroesophageal junction (GEJ) must have adequate distensibility to allow transit, but without causing dysphagia or gastro-oesophageal reflux[10]. For this purpose, the endoFLIP (impedance planimetry system) was developed (Figure 5). It is a probe in which a highly elastic polyurethane balloon (which assumes a cylindrical shape with volumetric distension) is mounted, equipped with a solid-state pressure transducer to measure intra-balloon pressure, as well as closely spaced impedance electrodes to acquire sectional area measurements along the length of the balloon. There are two probe sizes, 8 and 16 cm. The 8 cm probe only gives information from the gastroesophageal junction (Figure 6) and the 16 cm probe does not complement the distal oesophageal body. The relationship between the cross-sectional area and the pressures inside the balloon can be represented as the distensibility index (DI). DI was initially used to study GEJ, particularly in achalasia, before and after lower oesophageal sphincter intervention, where it was shown that symptomatic oesophageal outcomes correlate with low DI[11]. It can also be used for fundoplication procedures and as training for surgeons. Table 2 summarises the currently validated values and targets for the treatment of different pathologies. It is also possible to use it in other pathologies that mainly affect the GEJ such as eosinophilic oesophagitis or distal oesophageal spasm[4].

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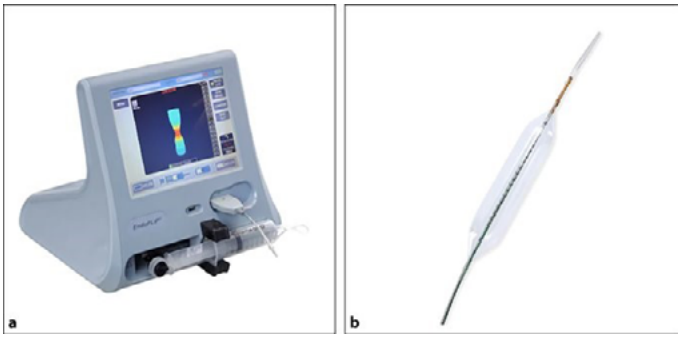

Figure 5. ***Endoflip kit currently marketed by Medtronic (a) and example of 16 cm probe (b).***

Figure 6. ***Graph of the gastroesophageal junction with 8 cm probe recorded with Endoflip. HUPM image.***

c. Others

This opens up a wide range of diagnostic possibilities and the patient can be classified according to whether he or she has a clearly complete or incomplete transit. Both to diagnose functional pathologies as mentioned above and to avoid diagnoses in healthy patients. This occurs, for example, in the secondary disorders included in the Chicago Classification[5] that do not involve a transit disorder and which until now we have been checking with another complementary test such as the barium transit. Thus, for example, we can observe at the same time that, even if we have a diagnosis of obstructed flow, the transit is complete. And this is reproducible with other diagnoses or doubts in some registries. Studies are underway to determine the prognostic value of bolus pressure and transit alterations[12].

In this respect, different rates and metrics are being developed in order to be able to complete the dysphagia study. Among the most relevant are currently[13]:

Oesophageal impedance integral (EII): The ratio between the presence of bolus before and after a peristaltic wave.

- Normal (where there is no bolus after the peristaltic wave).

- Fragmented peristalsis (where there is some bolus after a peristaltic sequence).

- Absent peristalsis (where the presence of bolus may be similar before and after the peristaltic wave).

The EII ratio in supine HRIM showed a strong correlation with video fluoroscopic findings.

Bolus flow time: The bolus flow time (BFT) represents the decrease in both pressure and impedance across the GEJ, resulting in the passage of the bolus through it.

Impedance nadir point: This is the intrabolus distension pressure that occurs at the point of maximum luminal distension. It corresponds to the point of maximum bolus accumulation. It coincides with the maximum distension in time and space. It allows the measurement of the intrabolus distension pressure during its transport (pressure at the impedance nadir).

Bolus height: When a 200 ml water challenge is administered with the patient standing during an HRIM study, the water column within the oesophagus can be quantified as the impedance bolus height (IBH) at the end of 5 min, using HRIM topography plots showing bolus retention (or lack thereof) in the oesophageal body.

In conclusion, the application of impedance technology to oesophageal HRM, as well as the development of impedance planimetry, especially with FLIP, has increased our understanding of oesophageal motor function and dysmotility. HRIM assesses oesophageal bolus transit with good correlation to videofluoroscopy, but without radiation exposure[14]. The development and better understanding of impedance-based metrics, such as PIB, nadir impedance pressures, EII and BFT ratios, improve our ability to better understand and assess bolus transit dynamics, especially with the development of automated impedance-manometry. HRIM has contributed to the Chicago Classification of oesophageal motor disorders and will likely play an even more important role in future classification interactions.

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	Normal	Undetermined	Abnormal
Oesophageal distensibility (FLIP 1.0 and 2.0)			
- Distensibility index of the GEJ	>3 mm²/mm Hg	2-3 mm²/mm Hg	< 2mm²/mm Hg
- Diameter of the GEJ	>18 mm	13-18 mm	<13 mm
Oesophageal contractility (FLIP 2.0)			
- Distension-induced contractility	Repetitive anterograde contractions	Indeterminate contractile patterns	Repetitive retrograde contractions Absence of contractility

Table 2. ***Interpretation of Endoflip values.***

24-hour ambulatory impedance testing

The procedure is very similar to ambulatory oesophageal pHmetry. A 2.1 mm catheter with multiple impedance sensors and an antimony electrode for pH detection is placed transnasally 5 cm from the upper edge of the LES, connected to a recorder or Holter (Figures 7A y 7b). Fasting between 4 and 6 hours is recommended, generally indicating the taking of antisecretory treatment even on the day of the test in cases where a study under treatment is required. Throughout the study period, the following are recorded: meal times, periods in decubitus and standing position, as well as the recommendation to take meals and perform activities that the patient is known to provoke episodes of gastroesophageal reflux[15,16].

Figure 7A. ***Example of 24-hour impedance testing equipment.***

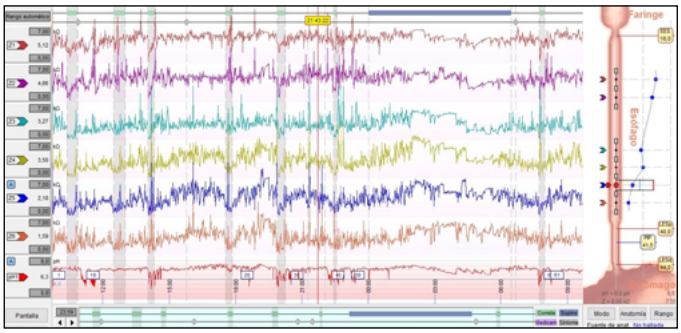

Figure 7B. ***Medtronic equipment and graph obtained.***

The main indications are[17] (Table 1):

1. In patients with heartburn or regurgitation unresponsive to twice-daily intensified proton pump inhibitors.

2. In patients with chest pain, throat or respiratory symptoms in whom gastroesophageal reflux disease is suspected, non-responders to double dosing.

3. Evaluation of patients with normal acid exposure, but increased episodes of non-acid reflux and/or an association between non-acid reflux and symptoms, increasing the number of patients suitable for anti-reflux surgery.

4. Patients with recurrent or persistent reflux symptoms after anti-reflux surgery as this may confirm or reject persistent gastro-oesophageal reflux and exclude other causes of symptoms, such as supragastric belching.

The composition of backflow episodes can be classified by MII into gas, liquid or mixed content; as air is a poor conductor of electricity and therefore has a high impedance, as opposed to liquid content which is a good conductor and has a low impedance. The proximal extent of reflux is localised by

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the changes in impedance of the liquid component recorded at the most proximal sensor.

It allows us to diagnose acidic, weakly acidic and basic reflux and its relation to symptoms. We can then study the different phenotypes, diagnosing hypersensitive oesophagus and functional heartburn[18].

Hypersensitive oesophagus is defined by

- Retrosternal symptoms, including heartburn and chest pain.
- Normal endoscopy and no evidence that eosinophilic oesophagitis is the cause of symptoms.
- Absence of primary motor disorders (PTEMP).
- Evidence of physiological GOR triggering symptoms, despite normal acid exposure on oesophageal pHmetry or impedance testing.

Functional heartburn is defined by:

- Retrosternal discomfort or pain in the form of burning.
- No relief of symptoms despite optimal antisecretory treatment.
- No evidence of GOR or eosinophilic oesophagitis as the cause of symptoms.
- Absence of PTEMPs.

In addition, they must be observed for at least the last 3 months, with the onset of symptoms at least 6 months prior to diagnosis and with a frequency of at least twice a week[5].

It should be noted that up to 40% of patients do not respond to treatment with PPI. Hypersensitive oesophagus is a condition that studies suggest may occur in 14-20% of patients with typical reflux symptoms. Approximately 10-15% of patients with erosive reflux disease and up to 50% of patients with non-erosive reflux disease (NERD) remain symptomatic despite treatment with PPIs[19].

However, persistent pathological reflux is rare, and IMM-pH analysis with PPIs demonstrates normal acid exposure time and low numbers of reflux episodes. In patients with normal acid exposure time (AET) when performing IMM-pH, the symptom index (SI) and symptom association probability (SAP) may provide evidence of a clinically relevant association between reflux episodes and symptoms[20].

In addition, this technique has introduced new concepts, such as:

Non-acid reflux:existence of reflux by IMM without fluctuation of the oesophageal pH.

Acid reflux:existence of a new reflux episode when the pH detector has not yet normalised the recording to above 4.

Weakly acid reflux:measurement of reflux by IMM with a decrease of at least 1 point in oesophageal pH always above 4.

Recently, two metrics have been integrated into the IMM-pH analysis: the post-reflux swallow-induced peristaltic wave index (PSPW) and more relevant the mean nocturnal basal impedance (MNBI). These are two independent indicators of reflux-mediated symptoms that increase the diagnostic yield of impedance testing. An MNBI <1,500 Ohms supports the diagnosis of GERD, while an MNBI >2,500 Ohms rules it out. A PSPWI may support the diagnosis of GORD, when this index is less than 60%.

Furthermore, in non-responders, the PSPW is significantly lower in refractory oesophagitis compared to healed reflux oesophagitis and NERD. It is the only IMM-pH parameter associated with PPI-refractory mucosal damage.

For all these reasons, IMM-pH allows us to more accurately diagnose patients with erosive and non-erosive gastro-oesophageal reflux and, above all, to identify functional disorders and carry out correct treatment[22].

Conclusion

In conclusion, we are faced with a technique in full development in terms of its use, on which different values and metrics are being studied to facilitate the diagnosis of functional pathologies. All this will provide us with a complete understanding of oesophageal function and the clinical picture of our patients. In addition, it is also useful for assessing response to treatment.

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REVIEW ARTICLE

EOSINOPHILIC GASTROENTERITIS

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Abstract

Eosinophilic Gastroenteritis, or better known as Eosinophilic Gastrointestinal Disease, is a rare disease that can affect both children and adults. It is characterized by an eosinophilic infiltrate that can involve the different layers of the digestive tract wall. Its origin is unknown, but most studies suggest that there is an allergic factor. The symptoms depend on the layer of the digestive tract that predominantly affects, and may cause diarrhea, malabsorption, abdominal pain, intestinal obstruction and ascites, among others. Regarding the diagnosis, it is established based on four criteria: gastrointestinal symptoms suggestive of eosinophilic gastrointestinal disease, demonstration of eosinophilic infiltration in one or more areas of the gastrointestinal tract in biopsy, absence of eosinophilic affection of extradigestive organs and absence of parasitic infestation, drugs inducers of eosinophilia and malignancy. The fundamental pillar of treatment is diet, although corticosteroids are sometimes used. Generally its prognosis is good.

Keywords: gastroenteritis, eosinophilic, diarrhea, abdominal pain, hypereosinophilic syndrome.

Introduction

Eosinophilic gastroenteritis (EG) or better known as Eosinophilic Gastrointestinal Disease (EGE), as EG is part of this entity, but sometimes we confuse terms, is an uncommon disease, with an estimated prevalence of around 6-8/100,000 inhabitants[1], although other studies estimate a higher prevalence of 30/100,000 inhabitants[2]. It was first described by Kaijser in 1937[3], and can affect both children (more common) and adults, more so in males. When it affects adults, it is

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most frequent between the third and fifth decade of life[4,5]. It is characterised by an eosinophilic infiltrate that can involve the different layers of the wall of the gastrointestinal tract, with no secondary cause of eosinophilia[6]. Its origin is unknown and the pathogenic mechanisms have not yet been elucidated, so an allergic cause has been postulated because a variable number of patients have been found to have a personal and/or family history of atopy (50%). There are also other associated risk factors such as higher socioeconomic status, Caucasian race, overweight and a hereditary component[7]. The clinical manifestations depend on the layer of the gastrointestinal tract that is predominantly affected[8].

Etiopathogenesis

Its origin is unknown. Existing studies suggest an allergic component associated with high levels of immunoglobulin E (20-50%)[9,10]. A Th2 lymphocyte population expressing interleukin 5 has been identified, suggesting that exposure to certain foods activates their differentiation and leads to eosinophilia. Eotaxin has also been shown to increase eosinophil recruitment at the gastrointestinal level in response to food antigen[11], leading to local inflammation by release of cationic cytotoxic proteins from these eosinophils. The infiltration of eosinophils into tissue and their degranulation leads to tissue fibrosis, thrombosis, small vessel vasculitis and persistent inflammation[12]. However, the pathogenic hypothesis of allergy cannot be sustained in all cases, as the personal or family history of allergic disease is not constant.

The location may be in any part of the gastrointestinal tract, with a predilection for the disease in the stomach and small intestine[13]. If the stomach is exclusively affected, it is called eosinophilic gastritis (EG), the stomach and small intestine: eosinophilic gastroenteritis (EG), the small intestine: eosinophilic enteritis (EE) and the colon: eosinophilic colitis (EC), although there may be diffuse involvement[14].

Clinical

The clinical manifestations of EGE are very varied and depend on the predominantly affected layer, location and extent of the disease[15,16], according to Klein's classification.

Mucosal infiltration (the most common) manifests with abdominal pain, diarrhoea, nausea, vomiting, weight loss and malabsorption (the latter especially in those with diffuse disease)[17]; muscular infiltration, the second most frequent, can cause abdominal pain secondary to subocclusive or obstructive symptoms if it affects the stomach, colon or small intestine, pseudochalasia if it affects the oesophagus, sometimes even perforation of the affected gastrointestinal tract[18] and if serosal infiltration predominates, the rarest involvement, in the form of eosinophilic ascite[8]. There are also other reported cases of complications such as eosinophilic cystitis (4.5%)[19], acute pancreatitis[20] and liver dysfunction[21] .

In the article published by the group of Abou Rached A *et al*[22], they suggested dividing the disease into four classifications: mild, moderate, severe and complicated, based on the initial clinical manifestations, laboratory, radiological, endoscopic and histological findings.

Diagnosis

The diagnosis of this entity is established on the basis of these four criteria[8]:

- Gastrointestinal symptoms suggestive of EGE.
- Demonstration of eosinophilic infiltration in one or more areas of the gastrointestinal tract on biopsy (note that mucosal biopsies are normal in subjects with disease localised in the muscularis and serosal layer).
- Absence of eosinophilic involvement of extradigestive organs.
- Absence of parasitic infestation - eosinophilia-inducing drugs -malignancy

Laboratory tests

Peripheral eosinophilia occurs in 80% of patients, more frequently if it affects the mucosal and serosal layer[4]. Furthermore, there is no relationship between the extent of peripheral eosinophilia and the degree of tissue infiltration or epithelial damage[10]. In addition, altered D-xylose test, anaemia, positive TSOH, elevated IgE especially in children, elevated ESR (25%) can also be observed. High levels of faecal and serum eosinophilic cationic eosinophilic protein have also been reported.

Imaging tests

In most patients radiological findings are normal[23]. Barium tests, CT and MRI reveal thickening of the intestinal wall or saw-tooth appearance of the small bowel mucosa. Ascites may also be seen.

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Endoscopy

In half of the patients the endoscopic examination is normal (although in the article published by Hui et al in 2018[24] describe 92% of normal colonoscopies). When findings are present they are usually non-specific: erythema, nodular mucosa, polyps, erosions and deep ulcers. It is recommended to take multiple biopsies, given the patchy involvement of the disease, at least 5 from normal areas of the stomach and small intestine, and to take biopsies from abnormal areas. If the biopsies are negative, this does not rule out EGE, because the involvement may be muscular or serous, and it is recommended that a full-thickness biopsy be performed by laparoscopy or endoscopy (full-thickness), especially in those who debut with intestinal obstruction and have thickening of the wall. Endoscopic biopsies with high-capacity forceps or endoscopic resection of the suspicious mucosa could also be attempted[14]. Echoendoscopy can also play an important role in cases of muscular and serosal involvement and facilitates biopsy by FNA[25].

Food allergy tests (allergen-specific IgE and prick test).

There are many doubts as to their clinical application in this entity. These tests lack both sensitivity (they miss about 40% of the causative agents) and specificity, so they do not effectively identify the foods that cause this condition, and even if they are suppressed in many cases, there is no improvement.

Anatomical pathology

Histological definition

EGE is a group of processes pathologically characterised by excessive eosinophils in mucosal biopsies from single or multiple sites of the gastrointestinal tract (GIT), simultaneously or sequentially, in the absence of secondary tissue eosinophilia. They are subclassified according to the site affected as eosinophilic oesophagitis (EE), eosinophilic gastritis, eosinophilic enteritis, and eosinophilic colitis.

Eosinophils are leukocytes with a bilobed nucleus and cytoplasm rich in fine pink granules with eosin staining, to which they owe their name coined by Ehrlich in 1879[26]. They are normally present in the mucosa of the entire gastrointestinal tract, with the exception of the oesophagus, where their presence is always pathological, but there are few studies that quantify the normal number of eosinophils, which complicates the ability to recognise a pathological increase in their number[27]. This difficulty also lies in the high intra- and interpersonal variability of normal eosinophil numbers, which is influenced by age, with numbers graded upwards along the GIT. The diagnosis may also be influenced by the representativeness of the endoscopic biopsy, either because it may present a patchy distribution, or involve one or more layers of the wall of the affected gastrointestinal segment. It may also depend on the subjectivity of the pathologist and even the variability of high power field sizes (HPF) according to the different microscopes used. There is a historical lack of diagnostic criteria and standardised methodology for eosinophil counts. There are currently no consensus recommendations except for eosinophilic oesophagitis[28], although concepts and terminology are recently being reviewed[29].

The most practical way to report the number of eosinophils in current practice would be a maximum peak in the most inflamed HPF, rather than multiple field counts and averaging, which is preferable for research studies[27].

Pending formal diagnostic criteria, the following cut-off points have recently been suggested for the number of eosinophils per HPF required for the diagnosis of EGE according to the location in the GIT:[30,31]

-Stomach: ≥30 eosinophils per HPF in 5 HPFs.

-Duodenum: ≥52 eosinophils per HPF.

-Ileum: >56 eosinophils per HPF

-Right colon: >100 eosinophils per HPF

-Transverse and descending colon: >84 eosinophils per HPF.

Given that eosinophils are a normal component of the gastrointestinal mucosa and the great variability in their numbers that they can present, establishing a diagnosis of eosinophilic gastroenteritis in endoscopic biopsies can be problematic. Collins proposed to differentiate between mucosal eosinophilia, when there is a slight increase in the number of eosinophils without additional pathological changes. The designation EGE would be reserved, when in addition to tissue eosinophilia there are additional pathological changes such as eosinophil degranulation, presence of intraepithelial eosinophils (superficial or cryptic), cryptic eosinophilic abscesses, architectural changes, and presence of eosinophils in mucosal muscle, submucosa or both[27]. This approach would avoid overdiagnosis of these processes that could lead to inappropriate treatment. On the other hand, due to the possible patchy distribution of these processes, along the GIT and depending on the wall layer affected, they may be

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underdiagnosed in endoscopic biopsies. It is advisable to take multiple biopsies, at least 4-5 from each location, of normal and abnormal mucosa. If the initial endoscopic mucosal biopsy is normal or mildly changed and suspicion of EGE persists, repeat biopsies may be indicated.

In general, features commonly found in EGE biopsies include:[30]

-Increased numbers of eosinophils. An extreme numerical increase (>100 per HPF) by itself may merit a diagnosis of EGE.

- Altered distribution of eosinophils. In normal gastrointestinal biopsies, eosinophils appear as discrete cells spread evenly in the deep lamina propria. In EGE biopsies, eosinophils appear as sheets in the lamina propria and eosinophils may be found in abnormal locations. These alterations should be considered significant for eosinophil-related disease. Small numbers of intraepithelial eosinophils are normal but markedly increased numbers of intraepithelial eosinophils, or eosinophil abscesses from glands or crypts, may indicate disease even in the absence of excess eosinophils in the lamina propria.

-Pathological alterations related to eosinophils, such as reactive epithelial changes (reduced mucin, increased mitotic activity, etc.).

- Absence of acute inflammation. The presence of acute inflammation in small bowel and colon biopsies that also show prominent eosinophil inflammation should be a reason to consider inflammatory bowel disease. Numerous eosinophils in colon biopsies may portend a poor prognosis in ulcerative colitis.

Eosinophilic gastritis (EG)

In the stomach, a mean eosinophil density greater than or equal to 127/mm (30 or more eosinophils per high power field in at least 5 separate fields) is required for diagnosis[32]. The most common histopathological findings are the presence of eosinophil sheets expanding the lamina propria in more than 50% of cases with altered behaviour and distribution of eosinophils, which tend to surround the foveola with the presence of intraepithelial eosinophils, although they typically do not extend into the lumen forming abscesses. Extension to the mucosal muscle or into the submucosa and degranulation of eosinophilic cryptitis/abscesses is observed in the absence of significant acute or chronic inflammation. They are often accompanied by regenerative epithelial changes and foveolar hyperplasia, or even necrosis and degeneration, but rarely develop frank ulcers. The differential diagnosis of primary or idiopathic GE includes several known causes of tissue eosinophilia in the stomach such as infections (*H. Pylori*, CMV), parasites (Anisakis spp., Strongyloides stercoralis), drugs, NSAIDs and after eradication treatment for *H. Pylori*, among others, food allergies, inflammatory bowel disease, vasculitis, connective tissue diseases, and solid and haematological malignancies[32]. It is of interest to know that drugs do not usually cause severe gastric eosinophilia as well as to consider invasive adenocarcinoma in the differential diagnosis. While intestinal-type adenocarcinoma is usually infiltrated by neutrophils, diffuse and signet ring adenocarcinoma frequently recruit eosinophils[33].

Eosinophilic enteritis (EE)

There is no consensus on normal ranges of eosinophil numbers in different segments of the small intestine. Low counts may be observed in normal biopsies (allergy or hypersensitivity). Pure eosinophilic duodenitis is not described and is exceptional. Sampling of duodenum, first cm of jejunum, and terminal ileum is recommended. The cut-off points for the number of eosinophils per HPF required for diagnosis are ≥ 30-52/ HPF in duodenum and >56 / HPF in ileum[5]. Apart from the numerical increase, altered behaviour and distribution of eosinophils infiltrating the surface epithelium is observed with counts of >2 Eo/HPF in duodenum or >4 in ileum. In cryptic epithelium, >6 Eo/HPF in duodenum and >4 in ileum. Other histological findings are the presence of eosinophils in muscularis mucosae and submucosa, eosinophilic cryptic abscesses, extensive degranulation, reactive epithelial changes, villous atrophy and crypt hyperplasia, epithelial cell necrosis, mast cell infiltrate or mesenteric lymph node hyperplasia due to eosinophilic infiltration with minimal chronic and active inflammation. For a diagnosis of EE, which is less common, the usual secondary causes of eosinophilia such as drugs, food allergies, parasites, inflammatory bowel disease, connective tissue disease/vasculitis, and neoplasms, as well as systemic eosinophilic disorders (idiopathic hypereosinophilic syndrome, chronic eosinophilic leukaemia, systemic mastocytosis) should be excluded[26].

Eosinophilic colitis (EC)

Eosinophil counts in normal colonic mucosa range from 10-70/HPF. There is no universally accepted range for diagnosing CE, more than 2 times the normal number. As mentioned above, cut-off points for the number of eosinophils per high power field required for diagnosis have been suggested, which

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show a decreasing gradient along the colon[30,31]. As in the other locations, there is also an altered behaviour and distribution of eosinophils, which excessively infiltrate the superficial epithelium, with the presence of >3 Eo/HPF in the right colon, >4 in the transverse and descending colon and >2 in the rectosigmoid colon. Cryptitis (Figure 1) and cryptic eosinophilic and eosinophilic cryptic abscesses in cryptic epithelium are observed: >11 Eo/HPF in CD; >4 in CT/CD; >9 in rectosigma and extension to muscularis mucosae and submucosa, as always in the absence of significant acute or chronic inflammation. The causes of secondary eosinophilia to rule out are the same as for EE. Parasites can provoke an intense eosinophilic response because this finding should prompt a search for helminth larvae such as *S. stercoralis* (Figura 2), Schistosoma eggs or fragments of *Trichuris trichiura*, with serial sections.

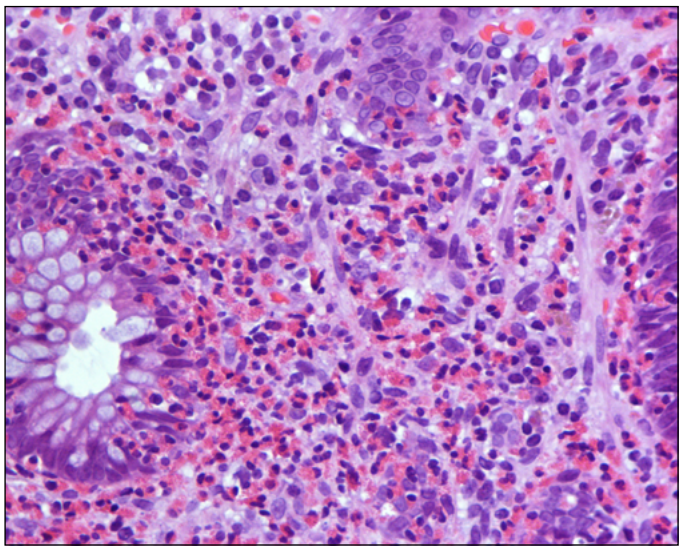

Figure 1. ***Eosinophilic colitis. Colonic mucosa with numerous eosinophils in lamina propria and infiltrating crypt epithelium.***

Differential diagnosis

The differential diagnosis should be made with those pathologies that present with blood and/or tissue eosinophilia associated with gastrointestinal symptoms. Therefore, the possibility of : Intestinal parasitosis (Ancylostoma, Anisakis, Ascaris, Strongyloides, Toxocara, Trichiura, Capillaria, Basidiobolomycosis, Trichinella), taking drugs (gold salts, azathioprine, cotrimoxazole, carbamazol, carbamazepine, NSAIDs), malignancy (lymphoma, leukaemia, gastric cancer and colorectal cancer), mastocytosis (a rare disease characterised by abnormal proliferation and accumulation of mast cells in various organs and systems. Clinically heterogeneous, it ranges from occasional pruritus to severe and repeated episodes with life-threatening mediator release. It frequently presents with eosinophilia), inflammatory bowel disease (especially Crohn's disease (tissue eosinophilia is present, rare peripheral eosinophilia), hypereosinophilic syndrome, polyarteritis nodosa, eosinophilic granulomatosis with polyangiitis and eosinophilic granuloma[34].

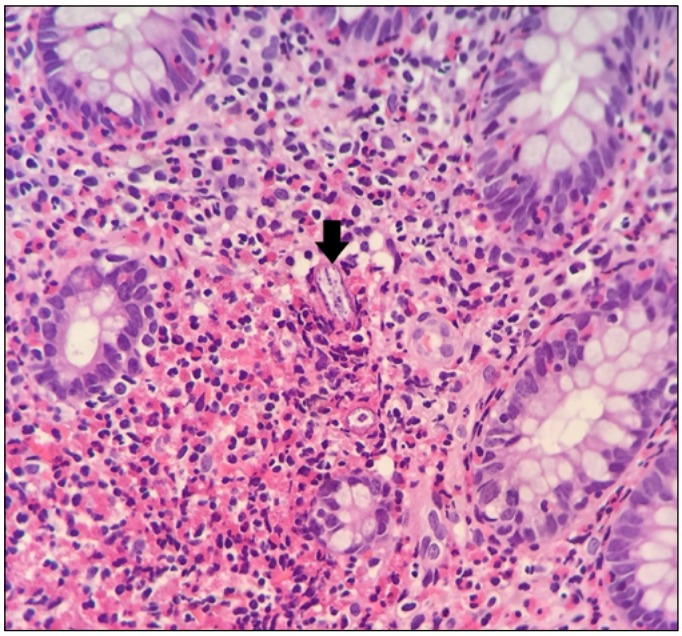

Figure 2. ***Parasitic infection. Dense collection of eosinophils surrounding a fragment of Strongyloides stercoralis (arrow).***

Treatment

Treatment is based on the little evidence available and on the severity of the disease, and there are no prospective controlled clinical trials.

-First line of treatment: Dietary treatment. If a limited number of allergens are detected in allergy testing, a targeted elimination diet is recommended[5]. If many or none are identified, it is recommended to start an elemental or empirical elimination diet eliminating the six most common food allergens (soy, wheat, egg, milk, nuts, fish/shellfish) for 6 weeks[35] . Fewer foods may be tried in mild disease. The main drawback of this type of diet is patient adherence, so it should be implemented in those who are motivated and under the guidance of an expert nutritionist. If a history of environmental allergens is identified, these should also be eliminated. Follow-up of these patients is based on symptomatology and changes in peripheral eosinophilia within four to six weeks. In patients with peripheral eosinophilia, a >50% reduction in eosinophils can be considered a good response to treatment. However, this follow-up option is not valid in patients with no peripheral eosinophilia or in those with other associated allergic diseases that also generate peripheral eosinophilia and do not respond to dietary treatment. There may also be a poor correlation between symptoms and histology, so it is important to perform biopsies of the gastrointestinal tract if in doubt. If there is a response after the diet, foods can be slowly reintroduced from

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the least allergenic to the most allergenic. In a study published in 2009[36], three of seven adults on an empirical elimination diet and all six adults on an elemental diet had significant symptom reduction, complete histological remission, endoscopic improvement and normalisation of peripheral eosinophilia within six weeks. Another prospective study in 2020, involving 15 adults, showed that after six weeks on the elemental diet, histological remission rates were 100%[37].

-2nd line of treatment: Corticosteroids. If there is no improvement with the elimination diet/elemental diet, or the patient refuses it, it is recommended to start treatment with steroids. Most of the reported case series have shown a response rate of up to 90%[38], although in more current reviews the values are lower (50%)[39]. Among patients with EGE, those with a predominantly serous pattern seem to respond best[40]. Regarding dosage, it is recommended to start at 20-40 mg/day (although in some series higher doses of 0.5-1 mg/kg/day have been suggested)[41]. Response usually occurs within two weeks of starting treatment, regardless of the affected layer, although others require longer treatment to control symptoms, so maintenance with induction doses for 2-6 weeks is recommended. Subsequently, we start a progressive reduction of the dose gradually, from weeks to months. However, some patients (25-70%) relapse on dose reduction, requiring prolonged treatment with a minimum dose. The aim is to be able to use the lowest dose necessary to control the symptoms of EGE. If there is no response to the oral route, the intravenous route should be used. Budesonide would also be an alternative in patients with proximal and distal disease (dissolved in water or crushed[42]) with the advantage of fewer side effects due to its lower systemic impact.

-Other alternatives: Evidence for other drugs is based on isolated cases or small case series, and many in clinical trials not yet completed.

· Azathioprine: Immunosuppressive agent. Its efficacy has been demonstrated in patients with refractory and steroid-dependent disease[43]. The dose is not well established due to the lack of controlled clinical trials, although it is usually used at the same dose as in inflammatory bowel disease (1.5 to 2.5 mg/kg/day), with prior measurement of TPMT enzyme levels. Other immunosuppressants such as 6-Mercaptopurine and tacrolimus may also be used.

· Mesalazine at doses of 2-4g per day.

· Mast cell inhibitors such as Sodium cromoglycate 800 mg per day, Ketotifen starting at 1 mg nightly with increments of 2-4 mg/day, for one to four months.

· Leukotriene antagonist: Montelukast at a dose of 10-40mg/day.

· Humanized anti-IL-5 antibody such as Mepolizumab: in one study it was shown to induce response in a group of six patients with EG, although subsequent relapse in eosinophilia was demonstrated in all responders with associated clinical relapse[44] ; Benralizumab: current phase 3 clinical trial, where the effect will be evaluated at 24 weeks; Reslizumab : in a pilot study, in which an intravenous dose (1 mg/kg) was administered, it was shown to be effective in reducing tissue and peripheral eosinophilia despite failure of symptomatic control[45]. On the other hand, Kim *et al.*[46] demonstrated improvement of eosinophilia and symptoms in six of eight patients with EG. However, recurrence of eosinophilia was the norm after discontinuation of the drug which, according to the authors, could be secondary to IL-5, since it was reversed with in vitro administration of Reslizumab.

· Anti-IgE monoclonal antibody (Omalizumab)[34]. In an article including nine patients, it significantly improved symptom scores and decreased gastroduodenal eosinophil count[47]. Randomized controlled studies are required to clarify its efficacy and safety in the management of this type of patient.

· Anti IL4/IL13: Dupilumab has been certified to reduce symptoms and eosinophilic infiltration in eosinophilic esophagitis. With respect to EGE, clinical trials are ongoing to prove its efficacy.

· Fecal transplantation : In an article published by the group of Dai *et al*[48], therapeutic efficacy was observed in a patient with EG who had undergone fecal transplantation and prednisone treatment. It is still unclear whether fecal transplantation could cure EG or maintain long-term clinical remission.

· Surgical treatment: Surgery may be necessary when complications occur or when the disease presents as an acute abdomen (obstruction or perforation). However, it should be avoided whenever possible, as it is not curative.

Natural history

The natural history is unknown, because the existing series of patients are small. Generally, EGE has a good prognosis, since mortality is rare except for complications associated with the process, and there does not seem to be an increased risk of development of neoplasms. Three forms of evolution are postulated:

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-After the outbreak, spontaneous remission.

-Others present exacerbation episodes months or years after the first episode.

-After the first outbreak, chronic course.

In an article published by a French group[49] selected a total of 43 patients, with a mean follow-up of 13 years, identifying three possible courses of the disease: 42% remitted completely, 37% had periods of exacerbation and 21% presented a chronic disease after the first exacerbation. They also concluded that the serous pattern has a relatively good prognosis presenting a majority of single flare-ups and no chronic course. On the contrary, the mucosal predominant pattern presented mostly a chronic continuous course and the muscular pattern was the most prone to relapse. Untreated patients may progress to malabsorption and severe malnutrition[50] and others to intestinal obstruction and perforation.

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CLINICAL CASE

CONCOMITANT VASCULAR COMPRESSIVE SYNDROMES: ARE THEY ALL DESCRIBED? ABOUT A CASE OF RECURRENT LOWER GASTROINTESTINAL BLEEDING.

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Abstract

Vascular compressive syndromes are a rare entity in which there is extrinsic venous vascular compression, usually by an arterial vessel and a hollow viscus or bony structure. These syndromes can appear isolated or in some cases concomitance of several at the same time has been seen, as in our case. Most of the time they are incidental findings in imaging tests, however, they can cause clinical and even morbidity and mortality of the patient. In our case, the patient presented lower gastrointestinal bleeding due to jejunal varices secondary to compression of a branch of the superior mesenteric vein between the superior mesenteric artery and the third duodenal portion, a syndrome not described in the literature, and which was causing recurrent gastrointestinal bleeding with hemodynamic repercussions.

Keywords: lower gastrointestinal hemorrhage, superior mesenteric artery syndrome, nutcracker syndrome, median arcuate ligament syndrome, May-Thurner syndrome.

Introduction

Vascular compressive syndromes consist of the entrapment of a vessel by another structure in a small anatomical space. They are rare and encompass many syndromes, some of which are not well known. Most of the time they appear incidentally, but they can be symptomatic and even require endovascular or surgical treatment, which is why it is important to be aware of them. In addition, concurrence of several syndromes has been described in the same patient without being able to determine a clear relationship between them.

Case description

A 29-year-old woman was brought to the emergency department for melaenic stools of 24 hours' duration, associated with syncope. The patient reported feeling asthenia and weakness in the last few days, with similar intermittent, self-limiting symptoms.

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Garrido Gallardo A, Briceño Delgado J, Carrillo Cubero B, Lombardo Galera S. Concomitant vascular compressive syndromes: are they all described? About a case of recurrent lower gastrointestinal bleeding. RAPD 2025;48(1):27-30. DOI: 10.37352/2025481.3

On examination, she was in regular general condition, with skin pallor and melena. Blood pressure 90/45 mmHg, heart rate 98 bpm. Blood tests showed haemoglobin 6.2 g/dL and haematocrit 18.8%.

As history, iron deficiency anaemia since childhood with transfusion requirements on several occasions, for which she was studied by paediatrics, internal medicine and haematology, without any diagnosis, and a body mass index (BMI) of 17.9 kg/m^2. She underwent normal upper and lower gastrointestinal endoscopy, enteroresonance and video capsule, with no findings of interest.

In May 2023, a double balloon enteroscopy was performed in another centre, describing a jejunal varix.

Given the patient's condition and clinical symptoms, an urgent abdominal CT angiography was requested (without contrast and with contrast in the arterial and venous phases). No active bleeding was observed in the study, but submucosal jejunal varices of significant size secondary to stenosis of the main branch of the superior mesenteric vein (SMV) just posterior to the truncal bifurcation, due to compression between the superior mesenteric artery (SMA) and the third duodenal portion (Figure 1).

Several vascular compressions are also observed: celiac trunk stenosis of approximately 50% by arcuate ligament; severe stenosis of the left renal vein by aortomesenteric compression with compensatory drainage through hypertrophic ipsilateral lumbar veins (nutcracker syndrome); discrepancy in size between both common iliac veins, due to compression of the left iliac vein origin by the right common iliac artery, with hypertrophy of the left hypogastric vein (May-Thurner syndrome), without the patient presenting clinical symptoms secondary to these findings (Figure 2).

Given that the patient presented recurrent gastrointestinal bleeding with haemodynamic repercussions, it was decided to perform surgery to clamp the branch of the SMV through the SMA and the third portion of the duodenum, freeing the SMV and reducing its pressure to avoid gastrointestinal bleeding (Figure 3).

The patient had a good postoperative period, with no new externalisations and stable haemoglobin levels during the 10 months of follow-up. Three months after surgery, a follow-up CT angiography of the abdomen showed post-surgical changes with a decrease in compression of the superior mesenteric vein due to an increase in the space between the SMA and SMV, as well as a significant decrease in the size of the jejunal varices.

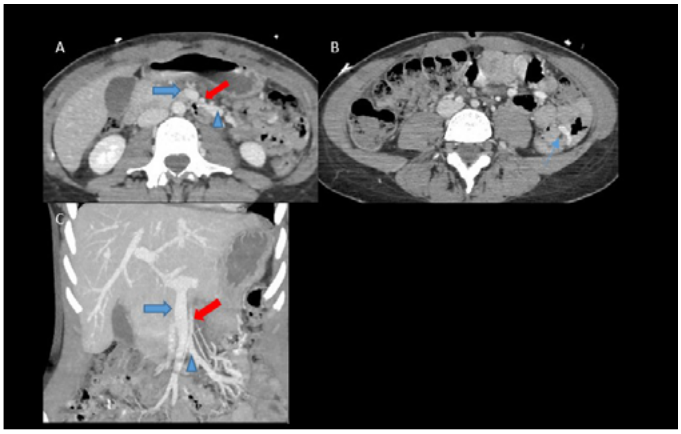

Figure 1. ***A and B Axial CT sections of the abdomen with venous phase contrast, C Coronal section, SMA indicated with thick red arrow, SMV with thick blue arrow and with blue arrowhead jejunal vein. A. Stenosis of SMV due to compression with the SMA and subsequent dilatation; B. Varicose vein in the jejunal submucosa (blue arrow); C. Superior mesenteric vein compressed by superior mesenteric artery, visualising dilatation of the jejunal vein after crossing.***

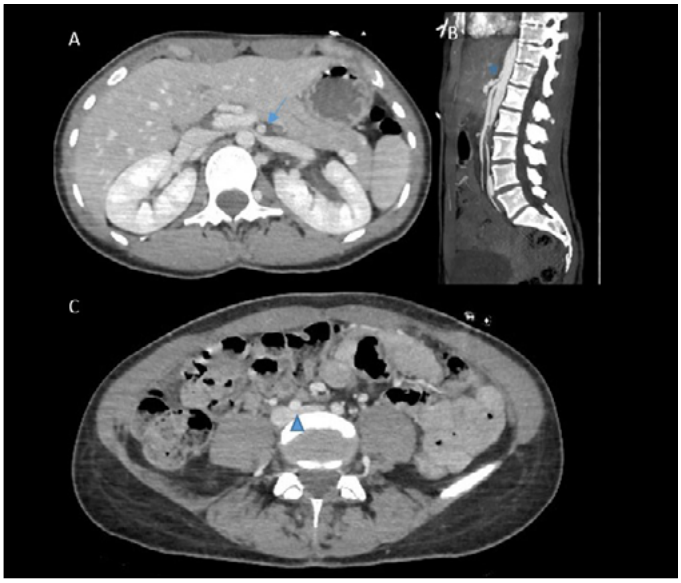

Figure 2. ***CT of the abdomen with contrast in venous phase; A. Axial section in CT of the abdomen with contrast, showing stenosis of the left renal vein due to compression between the aorta and superior mesenteric artery (nutcracker syndrome, blue arrow); B. Sagittal section, stenosis of the celiac trunk by arcuate ligament (blue star). C. Axial section, compression of the origin of the left common iliac vein by the right common iliac artery (May-Turner syndrome, blue arrowhead).***

Discussion

Compression syndromes are a rare group of pathologies[1,2]. They most often present as incidental findings on imaging tests, although, on some occasions, they may present a characteristic clinical picture with associated morbidity. However, it is

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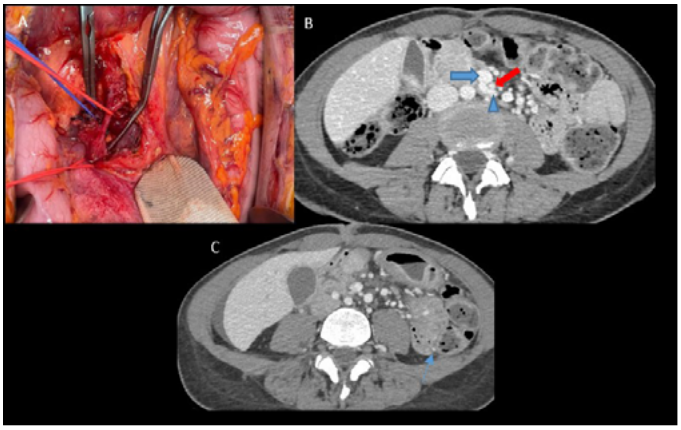

***Figure 3.* A. Image from the operating theatre, showing the superior mesenteric artery with red vessel loop and the superior mesenteric vein with blue. B and C. Axial slices of angio-CT of the abdomen with contrast after surgical treatment. B. Post-surgical changes with soft tissue material between SMV (marked with blue thick arrow V) and SMA (marked with red thick arrow), and decrease in calibre of the jejunal vein (blue arrowhead); C. Decrease in calibre of the jejunal submucosal varices (blue arrow) without increase in the number of varices.**

important to note that these syndromes must be accompanied by suggestive clinical features to be classified as a syndrome[3]

In our case, the patient presented with recurrent lower gastrointestinal bleeding caused by jejunal varices secondary to compression of the SMV by the SMA, which caused difficulty in venous return with a consequent increase in vascular pressure in the SMV. The SMA had an orthotopic location, with no anatomical variants. Therefore, this case serves to emphasise that not only vascular compressions with a known name[3,4] should be recognised, but also other less frequent compressions that can cause serious pathologies and even patient mortality.

In the literature, this vascular compression is not described as a syndrome, as those reported so far correspond mostly to aortomesenteric clamp syndrome, also known as superior mesenteric artery syndrome, which consists of obstruction of the third portion of the duodenum due to compression between the SMA and the abdominal aorta, causing abdominal pain and vomiting due to difficulty in intestinal passage at this level. Normally, the third portion of the duodenum is surrounded by retroperitoneal fat, which would act as a key factor, from which it could be deduced that patients with a low BMI, as in our case, are more predisposed to suffer from these syndromes[5].

Another of the syndromes presented by the patient is May-Thurner syndrome or iliac vein compression syndrome, secondary to obstruction of the left common iliac vein caused by the crossing of the right common iliac artery[1,2,4,6].

Nutcracker syndrome, also mentioned above, is uncommon and refers to the symptom complex that develops due to increased venous pressure in the left renal vein due to obstruction of its venous outflow into the inferior vena cava. Secondary to compression of the left renal vein by the aorta and SMA or, if the vein has a retroaortic course, between the aorta and the vertebral body[1,2,4].

Finally, arcuate ligament syndrome, or celiac artery compression syndrome, is rare and is considered to be present when narrowing of the proximal celiac trunk by the median arcuate ligament produces clinical symptoms of epigastric pain and weight loss, although these findings can also be seen in asymptomatic patients[1,2,4].

Imaging tests play a fundamental role not only in the evaluation of vascular structures, but also in the assessment of haemodynamic and morphological changes after vascular compression and their relationship with adjacent anatomical structures, being very useful for the surgical approach of patients requiring intervention.

Among the imaging tests, Doppler ultrasound can be used as first-line imaging, although it is highly dependent on the operator, who must have extensive experience, and is technically difficult to perform in obese individuals.

Generally, computed tomography (CT) will be the test of choice, due to its ability to produce reconstructed images, contrast resolution, multi-phase capability and non-invasiveness. The main drawback of CT is the use of ionising radiation, leaving MRI as an alternative diagnostic modality in patients allergic to iodinated contrast or when radiation exposure is a major concern, as these are usually young patients.

There are several published articles reporting cases in which a patient presents with several syndromes at the same time 7,8, one of which involved arcuate ligament syndrome and nutcracker syndrome, without seeing any relationship between the aetiology of these entities[9]. Recently, another article has been reported in which a patient presented with up to three concomitant compressive syndromes (arcuate ligament syndrome, nutcracker syndrome and aortomesenteric clamp), again with no clear relationship between these syndromes[10]. There does seem to be a consensus in the literature that these types of syndromes are more frequent in young patients with little intra-abdominal fat[2,5].

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In conclusion, imaging tests play a key role in the diagnosis of infrequent causes of recurrent lower gastrointestinal bleeding in young patients in whom there may be an underlying compressive syndrome, such as ours, which has not been described in the literature.

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CLINICAL CASE

UPPER DIGESTIVE HEMORRHAGE SECONDARY TO ARTERIAL MALFORMATION IN FUNDUS, RELATING TO A CASE.

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Abstract

Arteriovenous malformations are a rare cause (5%) of digestive bleeding. They are vascular lesions of generally congenital origin, characterized by the absence of a capillary bed between arteries and veins. They are very rare in the digestive tract, although they can cause bleeding that sometimes compromises the patient's life. The key to diagnosis is to identify the aberrant vessel in order to perform appropriate therapy, with vascular embolization currently being the most successful strategy.

The case of a 47-year-old man is presented, with a previous episode of unstudied upper gastrointestinal bleeding, who came to the emergency room due to hematemesis and melena. Given hemodynamic instability, multiphasic CT angiography was performed in which an anomalous arterial tangle dependent on the left gastric artery and branch of the splenic artery was observed. Embolization of the vessel is performed, which is successful.

Keywords: digestive hemorrhage, arterial malformation, fundus.

Introduction

Gastrointestinal bleeding is a frequent reason for consultation in hospital emergency departments. In most cases (85%) it is due to peptic ulcer disease, oesophagogastric varices, gastrointestinal erosions or oesophagitis. However, the remaining 15% include Mallory-Weiss syndrome, neoplasms and vascular anomalies, including angiodysplasias, Dieulafoy's lesion or vascular malformations[1].

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Parra López B, Rubio Enrile C, Bravo Aranda AM. Upper digestive hemorrhage secondary to arterial malformation in fundus, relating to a case. RAPD 2025;48(1):31-33. DOI: 10.37352/2025481.4

Arteriovenous malformations (AVMs) are a very rare cause of upper gastrointestinal bleeding (UGB), in which direct connections between arteries and veins persist without a capillary bed, due to the lack of complete differentiation of an embryonic vascular plexus, resulting in a high-flow vascular niche[2]. In the digestive tract they are frequently located in the cecum, right colon or jejunum, and rarely in the stomach or duodenum. They usually manifest as chronic or asymptomatic iron deficiency anaemia, although they may present as frank and life-threatening haemorrhage. Diagnosis of this entity is a challenge given its infrequency, the presence of non-specific endoscopic findings and the fact that, in most cases, it requires multidisciplinary therapeutic management[3].

The tests to be performed for diagnosis will depend on the clinical status of the patient. Initially, an endoscopic examination is recommended which, in case of haemodynamic instability, is replaced by a radiological imaging test, the gold standard being multiphase CT angiography, which is able to detect extravasation greater than 0.3mL/min[4]. AVMs typically enhance during the arterial phase and do not pick up in the enteric and delayed phases.

With regard to treatment, a surgical approach was classically necessary but, due to the accessibility of endoscopy and interventional radiology, such strategy is nowadays in disuse. The optimal endoscopic treatment consists of achieving mechanical haemostasis with haemoclips[5]. In case of ineffectiveness of endoscopic treatment or presence of haemodynamic instability, the most appropriate treatment is transcatheter vascular embolisation which, despite its high success rate, is not free of complications[6]. In refractory cases, surgery may be indicated.

Clinical case

We present the case of a 47-year-old male patient who last attended 12 years ago for ADH secondary to Forrest IB gastric ulcer due to NSAID consumption, with no other history of interest except for an alcohol habit in the hepatotoxic range.

He was transferred to the emergency department by ambulance due to haematic vomiting of 2 hours' duration together with syncopal symptoms and melaenic stools in the last 3 days. The patient denied abdominal pain, ingestion of gastrolesive drugs and a recent increase in his usual alcohol intake. During his stay in the emergency department, a nasogastric tube was placed, with abundant haematic debit, and a hypotensive episode was observed, which was resolved with the usual resuscitation measures. Analyses showed anaemia of 6 points (Hb 8.1, baseline 14.2) with no other alterations of interest, requiring the transfusion of 2 red blood cell concentrates and the start of intravenous perfusion of pantoprazole and somatostatin due to the undefined origin of the bleeding.

After clinical, analytical and haemodynamic stabilisation of the patient, it was decided to perform an upper gastrointestinal endoscopy, in which a thickened fold was observed at the level of the fundus, with a depressed area with a visible vessel, without spontaneous bleeding, which raised doubts about a fundic varicose vein or submucosal lesion. No oesophageal varices or other lesions with active or recent stigmata of bleeding are observed. During the procedure, there was spontaneous and massive jet bleeding and haemodynamic instability, so the endoscopic exploration was suspended without treatment and the patient was transferred to critical care to optimise haemodynamics.

It was then decided, in view of the arterial bleeding that generated clinical, analytical and haemodynamic repercussions, to perform a CT angiography of the abdomen (Figures 1-3), which showed abundant heterogeneous haematic content in the gastric chamber and an image of an arterial ball dependent on the Left Gastric Artery, and a branch of the Splenic Artery, which contacted the gastric fundus, producing a focus of extravasation at that level.

Following these findings, Vascular Radiology was contacted to consider embolisation of the anomalous vessels described, which was performed without incident (Figure 4), with a final check showing no contrast filling of other pathological vessels.

Once the embolisation of the anomalous arterial tangle had been performed, the patient was admitted for close monitoring on the hospital ward. During admission, the patient evolved favourably, with no new digestive externalisations and maintaining haemodynamic and analytical stability. After embolisation, a follow-up upper gastrointestinal endoscopy was performed, which showed the lesion already described in the previous examination, with post-embolisation changes and no recent or active signs of bleeding.

After consolidating the excellent clinical evolution, the patient was discharged with ongoing follow-up in the outpatient clinic, and was found to be totally asymptomatic.

Discussion

ADH is a frequent cause of consultation in hospital emergency departments. Among its various causes of

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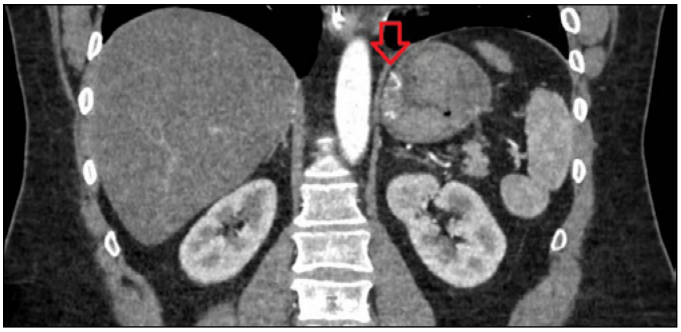

Figure 1. ***Coronal CT scan of the abdomen showing arterial balloon in contact with fundus (red arrow) generating contrast extravasation in the gastric chamber.***

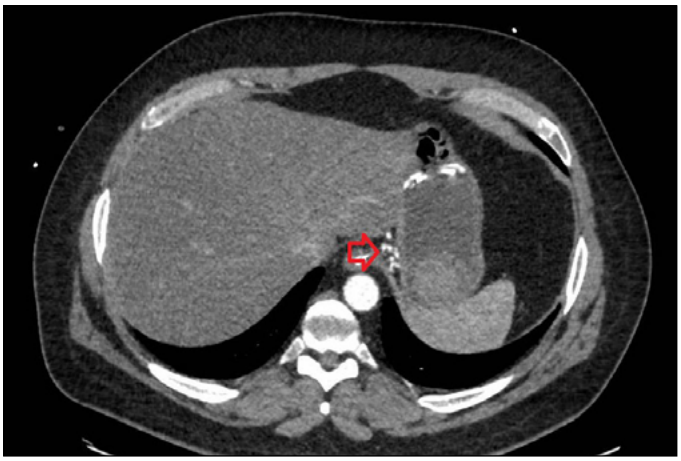

Figure 2. ***Cross-sectional CT scan of the abdomen showing a vascular tangle at the level of the fundus (red arrow) with hyperdense contents at the gastric level, compatible with active bleeding.***

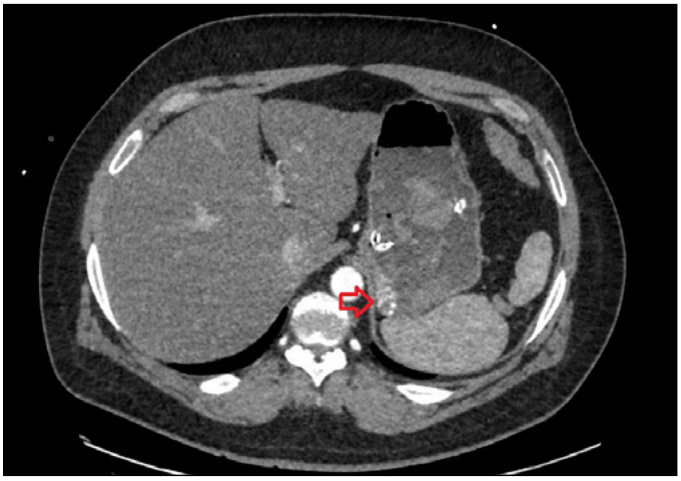

Figure 3. ***New cross-sectional CT scan of the abdomen showing contrast extravasation at the luminal level (red arrow).***

presentation, it is important to highlight the more unusual ones such as AVM, which we are concerned with in this case. It is essential to make a correct differential diagnosis of the nature of the bleeding lesion in order to apply the correct treatment. The therapeutic approach varies according to the haemodynamic stability of the patient, with endoscopic treatment being the first choice in cases of haemodynamic stability and embolisation

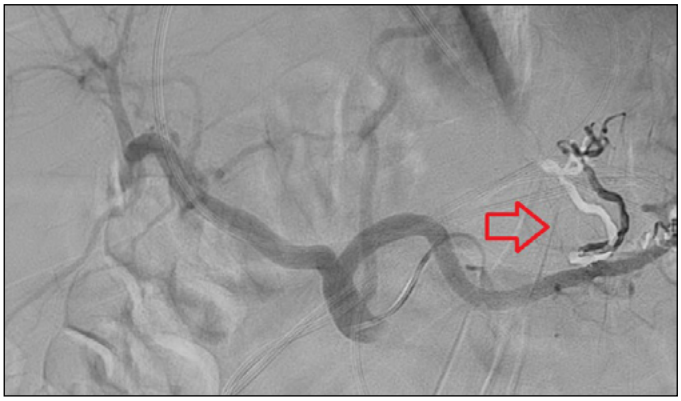

Figure 4. ***Radioscopy image showing left gastric artery-dependent arterial malformation (red arrow) and branch of the splenic artery subject to embolisation.***

or rescue surgery in cases of refractory or life-threatening massive haemorrhage. Arteriovenous malformations pose a diagnostic and therapeutic challenge that often requires a multidisciplinary approach.

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CLINICAL CASE

ACUTE PANCREATITIS AND POLYCYSTIC KIDNEY DISEASE, IS THIS RELATIONSHIP POSSIBLE?

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Abstract

Autosomal dominant polycystic kidney disease (ADPKD) is a disease characterised by the development of multiple cystic lesions at the renal level, which may be associated with extrarenal cystic manifestations. At the digestive level, liver involvement is noteworthy, and on very rare occasions may present as pancreatic cystic lesions that are usually asymptomatic.

We present the case of a 66-year-old male with a history of chronic kidney disease associated with this genetic variant, who was admitted for a second episode of acute pancreatitis with imaging tests showing the presence of a pancreatic cystic lesion causing obstruction of the pancreatic and biliary duct, which evolved favourably with conservative management.

Keywords: acute pancreatitis, locoregional complication, polycystic kidney disease.

Introduction

Autosomal dominant polycystic kidney disease (ADPKD) is a multisystemic disease with autosomal dominant inheritance with complete penetrance associated with mutation of the PKD1 and PKD2 genes. It is characterised by the presence of multiple bilateral renal cysts, as well as extrarenal manifestations that occur to varying degrees, with the development of cysts frequently at the hepatic level, known as hepatorenal polycystic disease, standing out at the digestive level. Like other digestive locations, cysts can be detected with low prevalence (9%) at the pancreatic level, which are almost always incidental findings[1,2].

Clinical case

A 66-year-old male with a history of chronic kidney disease associated with ADPKD who was admitted to our centre for a second episode of acute pancreatitis of an unidentified

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aetiology, ruling out in the anamnesis and with initial complementary tests (analysis and ultrasound) main causes of pancreatitis such as biliary lithiasis, toxic, hypercalcaemia, autoimmune, etc. At the analytical level, we highlight creatine of 1.8 mg/dl, dissociated cholestasis with gamma-glutamyl transferase of 650 U/L and alkaline phosphatase of 240 U/L, and amylase of 1450 U/L.

Given the patient's regular clinical evolution, abdominal computed tomography (CT) and magnetic resonance imaging (MRI) were performed, confirming the development of peripancreatic encapsulated necrosis at body level, highlighting the presence of several cystic formations in the head region and pancreatic uncinate process, the largest being 1 cm in size (Figure 1), causing minimal retrograde dilatation of the main pancreatic duct and the extrahepatic bile duct.

After conservative management of the process, the patient evolved favourably and was followed up on an outpatient basis with a control CT scan showing resolution of the necrosis, with persistence of a stable cyst at the level of the uncinate process without dilatation of the pancreatic duct or biliary tract.

Discussion

Incident cystic lesions at the pancreatic level are increasingly being diagnosed, with an estimated overall prevalence of between 13% and 18%, due to the increased use of more specific imaging tests such as CT or MRI3.[3].

In this case, and following the literature review carried out, we wish to show that pancreatic cystic lesions associated with ADPKD are rare, and the associated symptoms are even rarer. Isolated cases have been described of patients who developed episodes of chronic pancreatitis or cholangitis secondary to the obstructive process derived from these cysts[4,5]. The first reported case of a patient with complicated chronic pancreatitis was published in 1998 by Malka *et al*[6].

In these cases, conservative therapy is the first option to be followed in patients with acute-chronic pancreatitis, reserving the surgical approach of targeted pancreatectomy depending on the location of the lesion causing the obstructive process for cases of recurrent pancreatitis with associated complications or episodes of recurrent cholangitis[4-6]. In our case, the patient showed a correct clinical evolution after applying conservative measures.

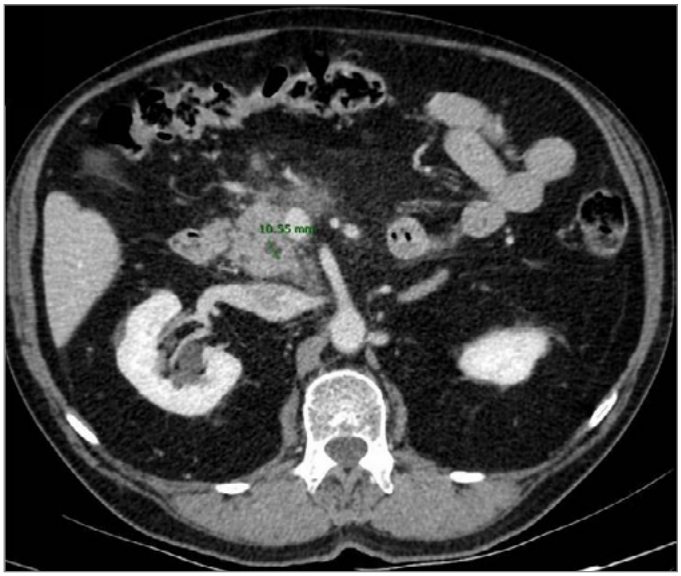

Figure 1. ***Axial section of abdominal CT scan with intravenous contrast. Cystic lesion 1cm in diameter at the level of the pancreatic uncinate process.***

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HISTOLOGICAL CHARACTERIZATION OF HETEROTOPIC MESENTERIC OSSIFICATION: AN UNUSUAL FINDING.

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Abstract

Heterotopic mesenteric ossification (HMO) is a rare benign entity, which consists of the formation of an ossifying pseudotumor at the base of the mesentery. It is generally preceded by an injury, trauma or abdominal surgery, and can develop weeks to years later. Histologically, it is characterized by the presence of fibrous septa in the mesentery that trap fat, nerves and vessels, formed by fibroblasts, osteoid tissue and bone, giving rise to very characteristic images as in the case we present.

Keywords: Heterotopic mesenteric ossification, intestinal obstruction, abdominal surgery.

Clinical case

We present the case of a 52-year-old patient with a history of splenectomy secondary to polytrauma. He presented to the emergency department for abdominal pain. Computed tomography showed a hypervascularised intraperitoneal mass with central star-shaped calcification suggestive of mesenteric carcinoid tumour. Surgical intervention was decided with findings of peritoneal splenosis with degenerated and calcified areas. Postoperatively, the patient presented with intestinal obstruction requiring a new operation, with extensive resection of the small intestine and colon. Pathological analysis showed an organised mesenteric haematoma with heterotopic mesenteric ossification (HMO), extensive fibrosis and focal sclerosis of the intestinal serosa, involving skeletal musculature with fat necrosis and foreign body type reaction with giant cells (Figures 1-3).

Discussion

HMO is a rare pathology, attributed to osteoblastic metaplasia of mesenchymal cells in response to severe inflammation, such as previous surgery or trauma[1]. Diagnosis is usually intraoperative, although it may be suspected by CT scan if calcifications are observed. The prognosis is generally

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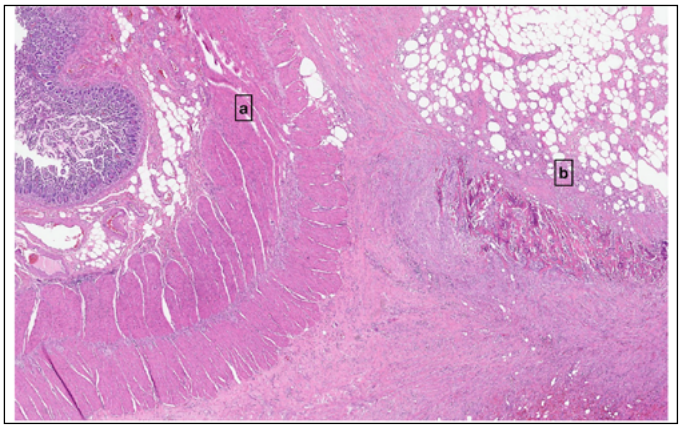

Figura 1. ***Microscopic image of a section of the intestinal wall (a) in which fibrosis of the serosa and mesentery with a focus of osteoid substance in its thickness can be seen (b).***

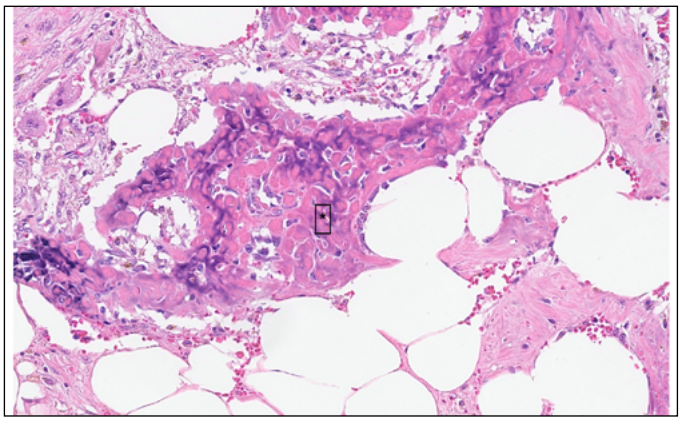

Figura 2. ***Disorganised mesenteric ossification focus (*).***

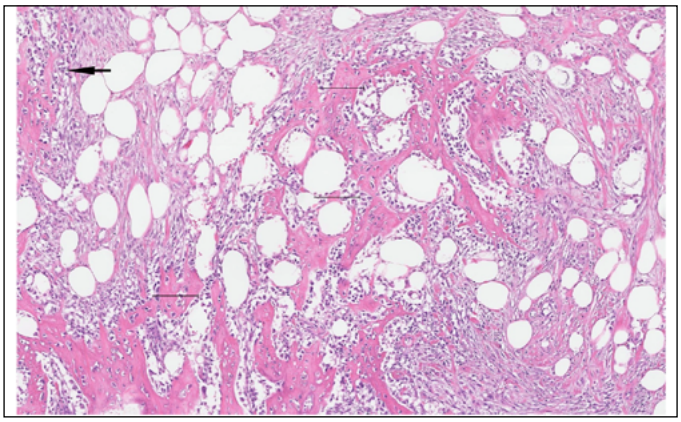

Figure 3. ***Detail of osteoid substance arranged in irregular, anastomosed trabeculae with identifiable osteoblastic cell rim (arrows).***

favourable, with conservative treatment being the treatment of choice to avoid further ossification[2].

Histologically, HMO is characterised by fibrous septa in the mesentery trapping fat, nerves and vessels composed of fibroblasts and variable amounts of osteoid and bone with a border of osteoblasts[3]. The differential diagnosis includes dystrophic calcifications and sarcomatous neoplasms[1].

This rare but important pathology, associated with a history of abdominal surgery or trauma, should not be overlooked. Although benign, its clinical presentation must be distinguished from malignant tumours, highlighting the importance of proper identification.

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