

MESTRADO INTEGRADO EM MEDICINA

Advancing Endovascular Solutions for Complex Abdominal Aortic Aneurysms: Patient Selectin, Imaging and Device Innovations

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Eu, Mariana Amorim Martins Lopes, abaixo assinado, nº mecanográfico 201905392, estudante do 6º ano do Ciclo de Estudos Integrado em Medicina, na Faculdade de Medicina da Universidade do Porto, declaro ter actuado com absoluta integridade na elaboração do meu trabalho de Dissertação ou Monografia.

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Advancing Endovascular Solutions for Complex Abdominal Aortic Aneurysms: Patient Selection, Imaging and Device Innovation

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É AUTORIZADA A REPRODUÇÃO INTEGRAL DESTES TRABALHOS APENAS PARA EFEITOS DE INVESTIGAÇÃO, MEDIANTE DECLARAÇÃO ESCRITA DO INTERESSADO, QUE A TAL SE COMPROMETE.	☒
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Faculdade de Medicina da Universidade do Porto, 20/03/2025

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- ☒ Não procedi à utilização de ferramentas de *chatbox* generativo baseadas em *large language models* para nenhuma das tarefas no contexto do meu trabalho de Dissertação ou Monografia
- ☐ Procedi à utilização de ferramentas de *chatbox* generativo baseadas em *large language models* no contexto do meu trabalho de Dissertação ou Monografia, encontrando-se todas as interações (*prompts* e respostas) transcritas em anexo bem como a indicação das aplicações utilizadas.

Neste sentido, confirmo que a eventual utilização de ferramentas de *chatbox* generativo baseadas em *large language models* no contexto do meu trabalho de Dissertação ou Monografia foi exclusivamente descrita na sequência de *prompts* e respostas transcritos em anexo e nas aplicações indicadas.

Faculdade de Medicina da Universidade do Porto, 20/03/2025

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"Ninguém é alguém sem a ajuda de outro alguém." (José Saramago)

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Advancing Endovascular Solutions for Complex Abdominal Aortic Aneurysms: Patient Selection, Imaging, and Device Innovations

Narrative Review

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ABSTRACT

BACKGROUND

Abdominal aortic aneurysm (AAA) poses a significant health risk, with a prevalence of 4.8%, and becomes a surgical concern when the diameter exceeds 5.5 cm due to the heightened risk of rupture. Endovascular aneurysm repair (EVAR) has emerged as the primary approach, especially for infrarenal AAAs, offering advantages over traditional open surgery. However, complex anatomies challenge standard EVAR, leading to the development of innovative endografts. This study reviews the literature on treating complex abdominal aortic aneurysms (C-AAAs), focusing on patient selection, preoperative imaging, and available devices.

METHODS

A comprehensive literature review was conducted on C-AAAs, encompassing treatment options, patient selection criteria, and preoperative imaging. Searches in Pubmed and Google Scholar utilized keywords such as “complex abdominal aortic aneurysm”, “fenestrated endovascular aortic repair (FEVAR)”, “branched endovascular aortic repair (BEVAR)”, “Chimney endovascular aortic repair (chEVAR)” and “patient selection.” Additional relevant articles were included through cross-referencing.

RESULTS

Patient selection for C-AAA endovascular treatment involves assessing rupture risk, operative mortality, life expectancy, and anatomical considerations. The impact of age on outcomes remains inconclusive across different studies. Preserving renal function is crucial,

particularly in patients with renal anomalies, which require careful evaluation. Precise measurements guide decisions, considering factors like aortic tortuosity. Preoperative imaging, particularly computed tomography angiography (CTA), is vital, providing comprehensive anatomical information. Intraoperative fusion imaging enhances real-time assessment, contributing to procedural precision. Device selection, including FEVAR, BEVAR, and Chimney endovascular aortic repair, is tailored to individual anatomy, with custom-made, off-the-shelf, and physician-modified devices offering diverse options.

CONCLUSION

The endovascular treatment of C-AAAs has undergone significant advancements, transforming therapeutic approaches. Optimal outcomes hinge on meticulous patient selection, comprehensive preoperative imaging, and tailored device selection. The evolution from traditional to innovative endografts reflects a paradigm shift. Ongoing research should refine risk assessment, optimize device modifications, and expand endovascular interventions' applicability for C-AAAs.

Keywords: Aortic Aneurysm, Abdominal; Endovascular Procedures; Renal Insufficiency, FEVAR; Stents.

1. INTRODUCTION

An aneurysm is characterized as a localized enlargement of a blood vessel that equals or exceeds 150% of its normal diameter. For practical purposes, the definition also, considers aneurysmatic when the abdominal aorta diameter reaches or surpasses 30 mm (1). Abdominal aortic aneurysm (AAA) has a prevalence of 4.8% in individuals aged 65 and older (2). Due to the significantly increased risk of rupture, surgical intervention is generally recommended once the aneurysm diameter reaches 55 mm in male and 50 mm in female (3).

Since the first successful reported endoluminal repair of AAA in 1991 (4), the adoption of endovascular aneurysm repair (EVAR) has significantly risen, establishing itself as the leading approach for addressing infrarenal abdominal aortic aneurysms (5, 6). This transition is attributed to the apparent advantages of EVAR over traditional open surgical repair, such as shorter procedure durations, decreased hospital stays, and diminished perioperative morbidity and mortality (7, 8).

However, standard EVAR has some requirements to be successful, such as adequate infrarenal aortic neck length, angulation that enables device fixation, absence of visceral vessels and adequate vascular access (2, 9). When these criteria are not met and patients present complex aortic anatomy, including complex aneurysms involving side branches, innovation in the field of EVAR has led to the development of more complex endografts, like parallel, fenestrated, and branched. These devices have broadened the anatomical spectrum of AAAs that can be treated with an endovascular approach (10).

Fenestrated and branched endografts are devices with openings and side branches arising directly from the graft that allow perfusion of the visceral and renal arteries (11). Recent studies

indicate that fenestrated and branched device placement is safe, effective and durable in patients with a high-surgical risk treated for complex abdominal aortic aneurysms (C-AAAs) (12, 13).

The aim of this study is to review the literature regarding the treatment of C-AAAs, focusing on patient selection, preoperative imaging and the various available devices.

2. METHODS

A comprehensive review of the literature was conducted out to identify studies focused on C-AAAs that included different treatment options, patient selection criteria and preoperative imaging. The search was conducted in PubMed and Google Scholar with the keywords “complex abdominal aortic aneurysm”, “fenestrated endovascular aortic repair”, “FEVAR”, “branched endovascular aortic repair”, “BEVAR”, “Chimney endovascular aortic repair”, “chEVAR” and “patient selection”.

Additional articles of scientific relevance for this non-systematic review were identified through cross-referencing.

3. RESULTS

3.1 Patient selection

Patient selection for endovascular treatment of C-AAAs is a critical aspect of ensuring successful outcomes. Clinical decisions are based on rupture and operative mortality risk, life expectancy, and criteria such as anatomical considerations, age, comorbidities and risk assessment (14).

Thus, comprehensive evaluation begins with a thorough history, physical examination, and investigation of familial and personal connective tissue disease history. The commitment to lifelong surveillance should be discussed and agreed upon with the patient. (15).

Precise measurements using center lumen line reconstruction software are crucial for accurately determining the diameter, distance, and angulation of the aorta, access vessels, and target arteries. Landing zones, defined as 25 mm of a healthy, normal-diameter artery with parallel walls, free of significant calcific or thrombotic disease, plays a vital role in patient selection. In cases where the proximal landing zone (PLZ) is diseased, the risk of aneurysm sac enlargement and the likelihood of reintervention significantly increase. A poor PLZ can lead to Type IA endoleak, requiring complex secondary interventions. Ideally, the PLZ should be in a native descending thoracic aorta or a previously placed surgical graft, as these provide better durability and lower rates of reintervention compared to a diseased aortic segment. (15). Factors such as aortic tortuosity influence the safety of endovascular device sealing, requiring longer overlap in highly tortuous segments (16). Anatomic contraindications such as small-diameter target arteries, excessive angulation, early bifurcations that are not suitable for bridging stents, as well as diffuse thrombotic or atherosclerotic debris, should be identified and addressed before further testing (15). An important and well-known risk factor for late complications after EVAR – large aneurysm diameter – should also be evaluated during pre-operative studies (17).

Diverging results from different studies have led to an inconclusive understanding of age as a risk factor for worse outcomes in the endovascular treatment of C-AAAs (18). Some studies have shown that advanced age is associated with a higher 30-day mortality rate (19) and a greater risk of being discharged to non-home locations (20). However, a recent study showed that age

was not associated with adverse outcomes after FEVAR, including mortality, lower technical success rates, complications or hospital length of stay (18).

Renal function is a critical determinant of morbidity and mortality, emphasizing the need to preserve renal function during fenestrated and branched endovascular repair (F/BEVAR) (21, 22). Anomalies such as solitary functional, horseshoe, or pelvic kidneys require careful assessment, with renal scintigraphy or perfusion studies aiding in determining vessel incorporation into repair (23, 24).

Risk assessment plays a pivotal role in the patient selection process. A recent study with 256 patients validated the functional status of the patient as a strong predictor of 2-year mortality: patients with a high level of dependency had a higher rate of 2-year mortality (25).

3.2 Preoperative imaging

Preoperative imaging and planning for the endovascular treatment of C-AAAs are imperative to ensure procedural success (10). Cross-sectional imaging, particularly computed tomography angiography (CTA), is the reference standard for preoperative imaging, offering comprehensive information on aneurysm sac anatomy, proximal and distal landing zones, and iliac vessels (14).

Some centers advocate a protocol of a CTA of the chest, abdomen, and pelvis with a slice thickness of ≤ 1 mm. This high-resolution imaging accurately assesses the entire aorta and its first-order branches (15). Protocols include contrast-enhanced examinations in arterial and portal venous phases, facilitating detailed analysis on dedicated workstations (26). Modern multi-detector helical CTA enables comprehensive study from the aortic valve to the femoral

bifurcation, providing essential diameter, length, and aortic lumen measurements in multiple projections (10).

In addition to conventional CTA, intraoperative fusion imaging is considered a crucial tool (27). This real-time assessment allows for immediate evaluation of aortic and target artery deformation. Techniques such as small-volume digital subtraction angiography sequences or newer real-time synchronization technologies aid in calibration, reducing radiation exposure while enhancing the likelihood of technical success (28).

While CTA is widely utilized, alternative imaging modalities have their roles. Once the standard, digital subtraction angiography (DSA) offers real-time evaluation but is invasive and only provides inner wall characteristics (11). Magnetic resonance imaging (MRI) is non-invasive, avoiding ionizing radiation and iodinated contrast agents, but is more susceptible to motion artifacts. Even so, measurements obtained with MRI were equally as accurate as CTA (29). Ultrasound and intravascular ultrasound (IVUS) have been employed, with IVUS providing intraoperative measurements for stent choice and deployment (30).

Quantitative measurements based on pre-procedure imaging are critical in determining the technical success of endovascular interventions. The evolving landscape of imaging technologies continues to enhance the precision and safety of preoperative planning for complex abdominal aortic aneurysms, allowing for tailored approaches and improved patient outcomes (11).

3.3 Device selection

3.3.1 FEVAR vs BEVAR: A comparative overview

Fenestrated endovascular aortic repair (FEVAR) (Figure 1) and branched endovascular aortic repair (BEVAR) (Figure 2) are the two most used methods of target artery incorporation, each one with advantages and disadvantages, although there is some overlap, most cases are very different (15).

However, all of the studies acknowledge that FEVAR and BEVAR not directly comparable at baseline given that they have instructions IFU and characteristics that define them (31).

FEVAR is typically the preferred method for incorporating target vessels that originate from narrow aortic segments (<42 mm) or those that are perpendicular to the aorta or angled upward (32). This method also has the advantages of less supraceliac aortic coverage and higher long-term patency, making it a better option than BEVAR for renal arteries. However, it requires precise planning and alignment (15).

In contrast, BEVAR is usually used in patients with wider aortic segments and target vessels that are caudally oriented and tortuous (minimum 25 mm) (32). The benefits of directional branches are easier implantation with more room for planning errors compared to fenestrated endografts and they can fit a wide range of anatomy. The drawbacks are the more extensive supraceliac coverage and lower primary and secondary patency, particularly for renal artery targets (33).

Device selection in C-EVAR involves a nuanced consideration of various manufacturers and their specific offerings.

The Cook Zenith Fenestrated Stent Graft is the sole fenestrated stent graft currently FDA-approved. Comprising a proximal body graft, a distal bifurcated graft, and one iliac limb, this modular system utilizes woven polyester fabric sewn to self-expanding Cook-Z stents. Fenestrations are available in small, large, or scallop configurations (9). Studies, including a multicenter prospective trial (34), establish its safety and efficacy. Results indicate a low incidence of aneurysm-related events, with promising outcomes at intermediate and long-term follow-ups. The high primary renal artery patency and low incidence of endoleaks are noteworthy, reinforcing its durability and effectiveness.

The Anaconda Fenestrated Stent Graft, though not FDA-approved in the United States, is commercially available in Europe. Comprising an aortic endograft and two separate iliac limbs, it boasts a unique design with nitinol ring stents and hooks for sealing. Its distinctive feature lies in full repositioning post-deployment (9). Clinical studies demonstrate its efficacy in addressing juxtarenal, pararenal, and type IV thoracoabdominal aneurysms (35, 36). While primary patency rates are encouraging, the repositioning feature, while advantageous, may pose challenges, warranting careful consideration (37).

Branched devices, integral to self-expanding stent grafts, offer versatility in orientation and configuration. The Cleveland Clinic's experience with branched sidearm devices, particularly those with an external helical branch, showcases excellent patency rates (38). Cook Zenith T-Branch and Gore Excluder Thoracoabdominal Branch Endoprosthesis represent off-the-shelf multibranched endografts with promising early results in Europe (39, 40). Ongoing studies will shed light on their long-term performance.

3.3.2 ChEVAR

However, when the anatomy is not favorable or when FEVAR devices are not available in an emergency setting, for instance, other alternatives can be considered such as parallel graft or chimney technique (ChEVAR). The Chimney endovascular aortic repair (chEVAR) or Snorkel technique is another option for treating C-AAAs (41). This device is also called a Parallel stent graft, because it is inserted parallel to the aortic stent-graft, in other words, the graft stays between the aortic wall and the main stent-graft to preserve normal perfusion to the involved target branches (14, 42). This technical strategy has its own disadvantages, especially the creation of a “channel” that results from the interaction between the chimney graft and the main aortic graft, so chEVAR is associated with an elevated risk of type Ia endoleak (>10%) (43).

3.3.3 CMDs, PMDs and off-the-shelf devices

Within FEVAR and BEVAR endografts, three different types have been described: Custom-made devices (CMDs), Physician-modified devices (PMDs) or Physician-modified endovascular graft (PMEGs) and off-the-shelf endografts (2, 44).

Typically, fenestrated endografts are custom-made (45). Thus, they are specifically tailored to the patient’s anatomy, contributing to precision-based medicine (46). If they are built to fit each specific patient, they will also require an extra manufacturing and delivery time (sometimes up to 12 weeks) (2), which is a limitation for their use in urgent situations, besides the increased risk of rupture during the waiting period (47).

An alternative for the CMDs is the off-the-shelf endografts, because they are designed to fit the anatomy of the majority of the general population, Therefore they can be used in urgent situations, if the patient does not diverge from the “population standard” (9).

From this arises, an obvious problem: the patients who need an urgent complex endovascular repair but may not be suitable for an off-the-shelf endograft. This group may benefit from a device that was previously produced but it's modified to suit in that individual patient's anatomy (2). So, PMEGs have the advantage of eliminating time of manufacture and delivery but keeping the individualized and precise structure. Nevertheless, stent graft modification is technically challenging and corresponds to an uncontrolled device modification (47). Even so, PMEGs appear to be safe and effective in the endovascular treatment of C-AAA (48).

4. CONCLUSION

In conclusion, the endovascular treatment of C-AAAs has witnessed significant advancements since its inception, transforming the therapeutic landscape for patients with intricate vascular pathologies. The prevalence of abdominal aortic aneurysms, reaching 4.8%, underscores the importance of effective intervention to mitigate the heightened risk of rupture associated with larger aneurysm diameters. The evolution from traditional open surgical repair to EVAR, especially with the introduction of fenestrated and branched endografts, reflects a paradigm shift in managing C-AAAs.

Meticulous criteria for patient selection are imperative for technical success. A comprehensive evaluation, considering anatomical factors, comorbidities, and risk assessment is crucial for optimal outcomes in this challenging patient population.

Preoperative imaging, particularly CTA, stands as the gold standard for assessing aneurysm anatomy and guiding procedural planning and intraoperative fusion imaging further

enhances real-time assessment, contributing to the precision and safety of endovascular interventions.

Device selection is tailored to the individual patient's anatomy, with fenestrated and branched endografts providing effective solutions for complex anatomies. The choice between FEVAR and BEVAR depends on factors such as aortic segment width, target vessel orientation, and the need for precise planning. CMDs, PMEGs, and off-the-shelf endografts present diverse options, each with its advantages and limitations.

The ongoing evolution of endovascular techniques and technologies, coupled with a nuanced understanding of patient selection criteria, emphasizes the dynamic nature of the field. Future research endeavors should focus on refining risk assessment, optimizing device modifications, and expanding the applicability of endovascular interventions for complex abdominal aortic aneurysms.

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FIGURE LEGENDS

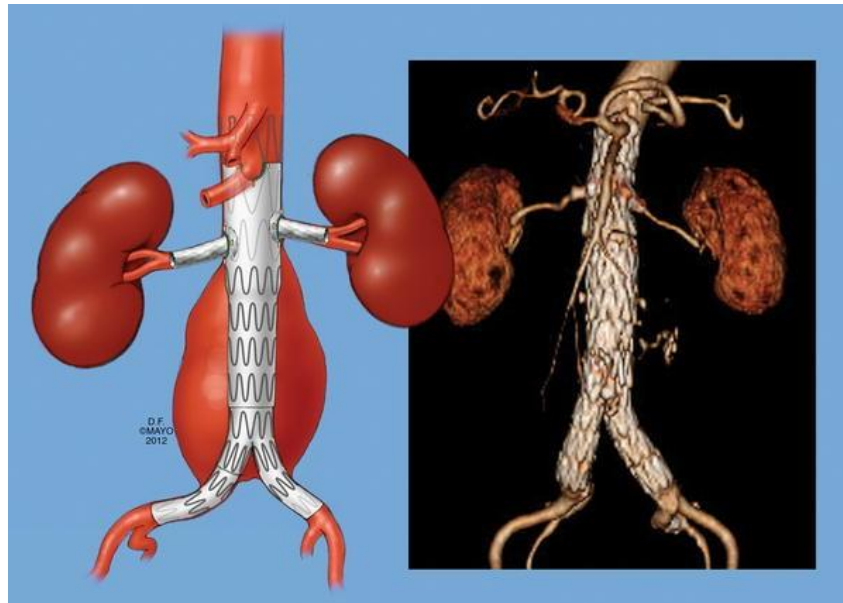


Figure 1. Endovascular repair of a juxtarenal abdominal aortic aneurysm with a fenestrated stent graft, and 3D reconstruction of postoperative computed tomography angiography demonstrating patency of visceral arteries and exclusion of the aneurysm sac. Image from Mendes, B.C., Oderich, G.S., Correa, M.P. et al. Endovascular Repair of Complex Aortic Pathology. *Curr Surg Rep* 1, 67–77 (2013). <https://doi.org/10.1007/s40137-013-0019-9>.

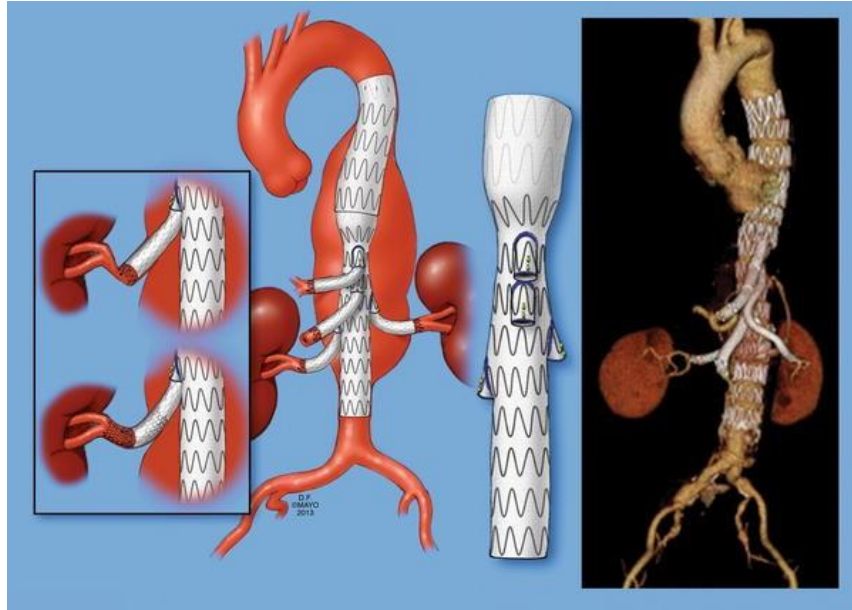


Figure 2. Endovascular repair of a type II thoracoabdominal aortic aneurysm using a physician-modified branched stent graft with a post-operative computed tomography angiography demonstrating exclusion of the aneurysm and patency of the visceral branches. Note in the inset the use of bare-metal stents to avoid kink in the renal artery after deployment of the covered stent. Image from Mendes, B.C., Oderich, G.S., Correa, M.P. et al. Endovascular Repair of Complex Aortic Pathology. *Curr Surg Rep* 1, 67–77 (2013). <https://doi.org/10.1007/s40137-013-0019-9>.

Scale for the Assessment of Narrative Review Articles – SANRA

Please rate the quality of the narrative review article in question, using categories 0–2 on the following scale. For each aspect of quality, please choose the option which best fits your evaluation, using categories 0 and 2 freely to imply general low and high quality. These are not intended to imply the worst or best imaginable quality.

Nota: Para a UC de Dissertação/Projecto, todos os seis items devem ser cumpridos em nível 2.

1) Justification of the article's importance for the readership

- The importance is not justified. _____ 0
 The importance is alluded to, but not explicitly justified. _____ 1
 The importance is explicitly justified. _____ 2

2

2) Statement of concrete aims or formulation of questions

- No aims or questions are formulated. _____ 0
 Aims are formulated generally but not concretely or in terms of clear questions. _____ 1
 One or more concrete aims or questions are formulated. _____ 2

2

3) Description of the literature search

- The search strategy is not presented. _____ 0
 The literature search is described briefly. _____ 1
 The literature search is described in detail, including search terms and inclusion criteria. _____ 2

2

4) Referencing

- Key statements are not supported by references. _____ 0
 The referencing of key statements is inconsistent. _____ 1
 Key statements are supported by references. _____ 2

2

5) Scientific reasoning

(e.g., incorporation of appropriate evidence, such as RCTs in clinical medicine)

- The article's point is not based on appropriate arguments. _____ 0
 Appropriate evidence is introduced selectively. _____ 1
 Appropriate evidence is generally present. _____ 2

2

6) Appropriate presentation of data

(e.g., absolute vs relative risk; effect sizes without confidence intervals)

- Data are presented inadequately. _____ 0
 Data are often not presented in the most appropriate way. _____ 1
 Relevant outcome data are generally presented appropriately. _____ 2

2

Sumscore

12

Fig. 1 SANRA - Scale

Nota 1: O ponto 5 diz respeito à contextualização da evidência científica em relação ao tipo de estudo(s) que a produziu (e, idealmente, à qualidade do mesmo(s)). O ponto 6 diz respeito a sustentar as afirmações com os dados quantitativos mais apropriado. A título de exemplo, para cumprir o ponto 5 ao invés de afirmar "já foi evidenciado que os testes de alergia às penicilinas apresentam alta especificidade e moderada sensibilidade", dever-se-á indicar a revisão sistemática com meta-análise de acuidade diagnóstica evidenciou que os testes de alergia às penicilinas apresentam alta especificidade (valor meta-analítico: 97%; IC95%=94-98%) e moderada sensibilidade (valor meta-analítico: 31%; IC95%=19-46%).

SANRA – explanations and instructions

This scale is intended to help editors assess the quality of a narrative review article based on formal criteria accessible to the reader. It cannot cover other elements of editorial decision making such as degree of originality, topicality, conflicts of interest or the plausibility, correctness or completeness of the content itself. SANRA is an instrument for editors, authors, and reviewers evaluating individual manuscripts. It may also help editors to document average manuscript quality within their journal and researchers to document the manuscript quality, for example in peer review research. Using only three scoring options, 0, 1 and 2, SANRA is intended to provide a swift and pragmatic sum score for quality, for everyday use with real manuscripts, in a field where established quality standards have previously been lacking. It is not designed as an exact measurement of the quality of all theoretically possible manuscripts. For this reason, the extreme values (0 and 2) should be used relatively freely and not reserved only for perfect or hopeless articles.

We recommend that users test-rate a few manuscripts to familiarize themselves with the scale, before using it on the intended group of manuscripts. Ratings should assess the totality of a manuscript, including the abstract. The following comments clarify how each question is designed to be used.

Item 1 – Justification of the article's importance for the readership

Justification of importance for the readership must be seen in the context of each journal's readership.

Consider how well the manuscript outlines the clinical problem and highlights unanswered questions or evidence gaps – thoroughly (2), superficially (1), or not at all (0).

Item 2 – Statement of concrete/specific aims or formulation of questions

A good paper will propose one or more specific aims or questions which will be dealt with or topics which will be reviewed.

Please rate whether this has been done thoroughly and clearly (2), vaguely or unclearly (1), or not at all (0).

Item 3 – Description of the literature search

A convincing narrative review will be transparent about the sources of information on which the text is based. Please rate the degree to which you think this has been achieved. To achieve a rating of 2, it is not necessary to describe the literature search in as much detail as for a systematic review (searching multiple databases, including exact descriptions of search history, flowcharts, etc.), but it is necessary to specify search terms, and the types of literature included. A manuscript which only refers briefly to its literature search would score 1, while one not mentioning its methods would score 0.

Item 4 – Referencing

No manuscript references all statements. However, those that are essential for the arguments of the manuscript – “key statements” – should be backed by references in all or almost all cases. Exceptions could reasonably be made for rating purposes where a key statement has uncontroversial face-validity, such as “Diabetes is among the commonest causes of chronic morbidity worldwide.”

Please rate the completeness of referencing: for most or all relevant key statements (2), inconsistently (1), sporadically (0).

Item 5 – Scientific reasoning

The item describes the quality of the scientific point made. A convincing narrative review presents evidence for key arguments. It should mention study design (randomized controlled trial, qualitative study, etc), and where available, levels of evidence.

Please rate whether you feel this has been done thoroughly (2), superficially (1), or hardly at all (0). Unlike item 6, which is concerned with the selection and presentation of concrete outcome data, this item relates to the use of evidence and of types of evidence in the manuscript's arguments.

Item 6 – Appropriate presentation of data:

This item describes the correct presentation of data central to the article's argument. Which data are considered relevant varies from field to field. In some areas relevant data would be absolute rather than relative risks or clinical versus surrogate or intermediate endpoints. These outcomes must be presented correctly. For example, it is appropriate that effect sizes are accompanied by confidence intervals. Please rate how far the paper achieves this – thoroughly (2), partially (1), or hardly at all (0). Unlike item 5, which relates to the use of evidence and of types of evidence in the manuscript's arguments, this item is concerned with the selection and presentation of concrete outcome data.

Fig. 2 SANRA—explanations and instructions document

REGRAS DE FORMATAÇÃO DA REVISTA ESCOLHIDA:

Submissions

Submission Preparation Checklist

As part of the submission process, authors are required to check off their submission's compliance with all of the following items, and submissions may be returned to authors that do not adhere to these guidelines.

- ✓ One author is named corresponding author and her/his e-mail and phone contact are given.
- ✓ The article is original, it is currently under submission for publication in the PJCTVS, and not to any other journal, and it has not been published previously.
- ✓ The work complies with ethical and legal principles - it complied with the recommendations of the Declaration of Helsinki of the World Medical Association and was evaluated and approved by the ethics committee, if an original study.
- ✓ All authors meet authorship criteria, and everyone accepts responsibility for the validity of the data, that everyone read and had access to all study data and all are in agreement with the content of the article and its submission to PJCTVS.
- ✓ All authors accept the assignment of copyright and agree to the availability of the manuscript in print or digital.
- ✓ Authors must declare potential conflicts of interest that could introduce bias or be seen as a bias in the conduct of their work in the manuscript.
- ✓ The work indicates the sources of funding if applicable.
- ✓ Manuscript is prepared as following: 12 point Times New Roman font, double-spaced and justified text, numbered page in the lower right corner, numbered lines to the left.
- ✓ The different sections of the text are clearly identified: Title, Summary, Keywords, Text (Introduction, Methods, Discussion, Conclusion), Acknowledgment, Conflict of Interest, Funding, References, Captions (of Figures and Tables).
- ✓ Citations are in superscript and References are in Vancouver style.
- ✓ The images and tables are submitted as separate files.
- ✓ The submission adheres to the remaining requirements outlines in the Author Guidelines of the PJCTVS.

Author Guidelines

A - Editorial policies

Objectives and Scope

The journal of the Sociedade Portuguesa de Cirurgia Cárdio-Torácica e Vascular was founded in 1991 and represents an official body of the now renamed Sociedade Portuguesa de Cirurgia Cardíaca Torácica e Vascular (SPCCTV). The main objective of the SPCCTV's Journal is to publish high quality papers in the areas of Cardiac, Thoracic and Vascular Surgery.

The second objective of the SPCCTV's Journal is to facilitate and stimulate discussion and information sharing, as much as ethical, economic and social questions related to Cardiac, Thoracic and Vascular Surgery, constituting a forum for divulging progress in all areas related to the three specialties.

The SPCCTV's journal is published every three months in an electronic version, with the published articles available online. All the papers of the SPCCTV's Journal are published as Open Access, with no associated processing fees, thanks to the support of the Sociedade Portuguesa de Cirurgia Cardíaca Torácica e Vascular.

The rigor and accuracy of the results published in the SPCCTV's journal, as much as the opinions expressed, are an exclusive responsibility of the authors.

Editorial Freedom

The SPCCTV's journal adopts the ICMJE's definition of editorial freedom, described by the World Association of Medical Editors, which states that the editor-in-chief assumes complete authority over the editorial content of the journal. The Sociedade Portuguesa de Cirurgia Cardíaca Torácica e vascular, as owner of the SPCCTV's Journal, does not interfere in the process of any manuscript's evaluation, selection, programming or editing. The journal is an autonomous body of the SPCCTV, and the editor-in-chief and associated editors have complete editorial independence.

General view

The Portuguese Journal of Cardiac Thoracic and Vascular Surgery is ruled by the norms of biomedical editions developed by the International Committee of Medical Journal

Editors (ICMJE), available at: <http://www.ICMJE.org>, and by the Committee on Publications Ethics (COPE).

The editorial policy of the Portuguese Journal of Cardiac Thoracic and Vascular Surgery integrates the Editorial Policy Statements issued by the Council of Science Editors into the review and publication process, covering the responsibilities and rights of editors of scientific mediated Journals.

(<http://www.councilscienceeditors.org/i4a/pages/index.cfm?pageid=3331>).

Guidelines for Study Presentation

Papers should be prepared according to the norms of the International Committee of Medical Journals Editors: Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals (ICMJE Recommendation) available at <http://www.icmje.org/recommendations/>

The Portuguese Journal of Cardiac Thoracic and Vascular Surgery recommends the guidelines for publication of the EQUATOR network (<http://www.equator-network.org>). Check lists are available for several study designs, including:

- Randomized controlled trials (CONSORT) - <http://www.consort-statement.org/>
- Systematic reviews and meta-analyses (PRISMA and extensions) - <http://prisma-statement.org/>
- Observational studies (STROBE) - <https://www.bmj.com/content/335/7624/806>
- Case reports (CARE) - <https://www.care-statement.org/>
- Qualitative research (COREQ) - http://cdn.elsevier.com/promis_misc/ISSM_COREQ_Checklist.pdf
- Diagnostic/prognostic studies (STARD) - <https://www.equator-network.org/wp-content/uploads/2015/03/STARD-2015-checklist.pdf>
- Economic evaluations (CHEERS) - <https://www.equator-network.org/wp-content/uploads/2013/04/Revised-CHEERS-Checklist-Oct13.pdf>
- Pre-clinical animal studies (ARRIVE)–<https://arriveguidelines.org/arrive-guidelines>
- Guidelines (GRADE) - <https://pubmed.ncbi.nlm.nih.gov/21185693/>
- Clinical protocols (SPIRIT) - <https://www.spirit-statement.org/>

Acceptance criteria for all papers are investigation quality and originality and its meaning to the Portuguese Journal of Cardiac Thoracic and Vascular Surgery readers. Except when duly mentioned, all manuscripts are submitted to double blind peer review process by at least two anonymous reviewers. Final acceptance or rejection falls to the Editor-in-chief, who reserves the right to refuse any publication material, after consulting the Associated Editors.

Manuscripts must be written in a clear, concise and direct style, to be understandable to the readers. When the contributions are considered adequate for publication based on the scientific content, Editors reserve the right to modify the text to eliminate ambiguity and repetition, and improve the communication between the author and the reader. If extensive changes are required, the manuscript will be returned to the author for revision.

The manuscripts that do not comply with the instructions to authors will be returned for remaking before being reviewed.

Criteria of Authorship and Authorship Form

As referred in the Requirements ICMJE, authorship requires a substantial contribution to the manuscript. The presentation letter should specify each author's contribution to the final paper.

Individual author contribution statement

All those designated as authors must meet the four authorship criteria described below, and all those who fulfill all four criteria must be identified as authors. The contributors, who do not fill the four authorship criteria, must be referred in the acknowledgement section, specifying their contribution.

Each manuscript must have a “corresponding author” to whom all questions referring the theoretical content will be addressed. However, all authors must take public responsibility over the content.

Authorship criteria:

- Have a substantial intellectual direct contribution in the design and writing of the paper;
- Participated in data analysis and interpretation

- Participated in manuscript writhing, reviewing, critical revision of the content and approval of the final version.
- Agree to assume responsibility over the accuracy and integrity of the entire process

Besides being responsible for part of the work, an author must be able to identify which coauthors were responsible for specific contributions. Funding, data collection or general supervision of the work group, by itself, does not qualify as authorship.

Group authorship

When a large group of authors produces a paper, this group must decide, in the beginning who will be the listed authors of the manuscript submitted for publication. All group members listed as authors must meet the four authorship criteria – including approval of the final version of the manuscript – and should be able to take public responsibility over the full content done by the other authors. Some groups, especially when numerous, attribute authorship of the study to the group name, listing or not individual names. When submitting a manuscript whose authorship is a group, the corresponding author must specify the name of the group, if it exists, and clearly identify which group members can claim credit and assume responsibility over the paper as authors. When authors publish on behalf of a group, group members must be listed in appendix.

If a medical writer was involved in writhing the manuscript, a signed statement by the corresponding author is necessary, indicating the name and whether there was funding of this person. This information must be added in the acknowledgments section. A signed statement by the medical writer allowing to be mentioned in the acknowledgments section must be provided.

Changes in authorship

It is expected that the authors carefully consider the list of authors prior to submission. The authors must determine among themselves the order by which they appear and resolve any disagreement before submitting their manuscripts for publication. Changes in authorship (either in order or number of authors) must be discussed and approved by all authors. Any change in number or name of the authors must be accomplished before

acceptance by the journal editor. To require the change a communication by the corresponding author must be received mentioning: a) the reason for authorship change, b) written consent by all authors. Only in exceptional conditions, will the editor accept changes in authorship after paper acceptance.

Corresponding Author Role

The corresponding author will act on behalf of all co-authors as the preferred contact for the editorial team during the submission and review process.

The corresponding author on behalf of all co-authors is responsible for communication with the journal during the submission, peer review and publication process. He is also responsible for ensuring all journal administrative requirements (providing authorship details; ethics committee approval; conflict of interest forms; informed consent).

Before and during the submission process, the authors must:

- Submit a cover letter which must justify the interest in publishing the article in PJCTVS; the corresponding author should sign the letter in the name of all authors confirming that all meet authorship criteria; the contribution of each to the work must be specified.
- Confirm that the article is original, that it was only submitted for publication in the PJCTVS and that it has not been published previously.
- Confirm that the work complies with ethical and legal principles (it complied with the recommendations of the Declaration of Helsinki of the World Medical Association and was evaluated and approved by the ethics committee, if an original study).
- Confirm that all authors accept responsibility for the validity of the data, that everyone read and had access to all study data, and all are in agreement with the content of the article and its submission to PJCTVS.
- Accept the assignment of copyright and agree to the availability of the manuscript in print or digital.
- Ensure that authors declare potential Conflicts of Interest that could introduce bias or be seen as a bias in the conduct of their work in their article.
- Indicates the sources of funding if appropriate.

- Confirm that the submission adheres to the requirements outlines in the Author Guidelines

Responsibility for the content

Although editors and reviewers make efforts to ensure the technical and scientific quality of the manuscripts, the final responsibility for the content (namely the accuracy and precision of the observations, as well as the opinions expressed) is the sole responsibility of the authors, who belong to intellectual property of the articles.

Conflicts of Interest

Each of the authors must indicate in their article whether or not there is any type of Conflict of Interest. In this context, authors are required to disclose any financial and personal relationships that exist in relation to the work they submit. They should also identify any benefits that may be associated with the publication of the article, including: shares or financial interests in companies or other institutions, salaries or bonuses, scholarships or other forms of financing, consultancy, patent rights or any other types of financial relationships. Any other personal, professional, political, religious, or any other relationship that readers may consider likely to influence the article being published should also be reported. This information will be kept confidential during the manuscript review and will not influence the editorial decision, but will be published with the article if accepted. The existence of conflicts of interest for the publication of an article is not a reason for its rejection, as long as such conflicts of interest are properly declared. If in doubt about what constitutes a relevant financial or personal interest, authors should contact the Editor-in-Chief.

Consent of Patients

Authors are responsible for obtaining informed consent for each clinical case. In photographs, videos, or medical imaging, the respective patient's/individual identity must be hidden. Personal data, such as occupation or residence, should be omitted, except when epidemiologically relevant.

Studies in patients or volunteers need ethics committee approval and informed consent from participants. The opinion of the ethics committee (namely regarding the need for

informed consent) must be documented in the article. The protocol number approved by the ethics committee must also be mentioned. Authors must also ensure compliance with regulation (EU) 2016/679 of the European Parliament and of the Council of April 27, 2016.

All animal experiments must comply with the ARRIVE guidelines and must follow the European Union directive EU Directive 2010/63/EU for animal experiments, and the authors must explicitly state that these recommendations have been followed.

Duplicate Submission and Publication

PJCTVS does not accept material previously published in printed or electronic form, as well as manuscripts under consideration in another magazine. Except for the previously mentioned publications in the form of abstract, academic thesis or conference communication. PJCTVS endorses the ICMJE's policies regarding the duplication of publications.

Plagiarism Policy

Intentional or not, plagiarism is a serious violation. We define plagiarism as reproduction of another work with at least 25% similarity and no citation. If evidence of plagiarism is found before/after acceptance or after publication of the article, the author will be given an opportunity to rebut. If the arguments are not found to be satisfactory, the manuscript will be retracted.

Peer Review

All manuscripts submitted to the PJCTVS undergo peer review. There is a strict double anonymization policy, which means that authors are anonymized to reviewers and vice versa. Reviewers are required to respect the confidentiality of the peer review process and not reveal details of a manuscript or its review during or after the peer review process. If reviewers wish to involve a colleague in the review process, they must first obtain permission from the Editor.

The acceptance criteria for all works are the quality, clarity and originality of the investigation and its meaning for our readers. Manuscripts must be written in a clear,

concise, and straightforward style. The manuscript must not have been published, in whole or in part, nor submitted for publication elsewhere.

All submitted manuscripts are initially evaluated by the Editors and may be rejected at this stage, without being sent to reviewers. Final acceptance or rejection rests with the Editor-in-Chief, who reserves the right to refuse any material for publication. The PJCTVS editorial board will send manuscripts to external reviewers selected from a database. Editors reserve the right to return to the corresponding author all manuscripts that do not comply with the instructions to the authors.

Letters to the Editor or Editorials will be evaluated by the Editorial Board, but external reviews may also be requested.

In the evaluation, manuscript reviews will be classified as:

1. Accepted without changes
2. Accepted, pending on minor revisions
3. Reassess after major changes
4. Rejected

Within 30 days, the reviewer must respond to the Editors indicating their comments on the reviewed manuscript and the suggestion of acceptance, review or rejection of the work. Within 10 days, the Editorial Board will make a decision that may be: to accept the manuscript without modifications; send the reviewers' comments to the authors as established; rejection.

When changes are proposed, authors have 30 days (a period that can be extended at the authors' request) to submit a new revised version of the manuscript, incorporating the comments of the reviewers and the editorial board. They must answer all questions in a separate document and also submit a revised version of the manuscript, with the amendments inserted with the “Track changes” function enabled.

Editors have 10 days to make the decision on the new version: reject or accept the new version or forward it for further consideration by one or more reviewers.

In case of acceptance, in any of the previous phases, it will be communicated to the Corresponding Author.

In proof review, substantial changes to the manuscript will not be accepted. The inclusion of these changes may motivate the rejection of the manuscript by decision of the Editors. In the typographic proof review phase, fundamental changes to the articles

will not be accepted and may imply their subsequent rejection by decision of the Editor-in-Chief.

Although editors and reviewers make every effort to ensure the technical and scientific quality of the manuscripts, the ultimate responsibility for the content (namely the accuracy and precision of the observations, as well as the opinions expressed) rests solely with the authors.

Publication Costs

There will be no publication costs (there are no submission or publication fees for color images).

Typographic proofs

The typographic proofs will be sent to the authors along with the revision deadline according to the publication needs of the PJCTVS. The reviewed article must be approved by the corresponding author. Authors have 48 hours to review the text and report any typographical errors. At this stage, the Authors cannot make any background modifications to the article, other than corrections of typographical and / or spelling errors.

If failure of the Authors to honor the deadline frees the PJCTVS occurs, the PJCTVS Editorial Team may proceed with the revision and editing of the paper while dispensing the Authors' authorization.

Errata

The magazine PJCTVS publishes changes or amendments to a previously published article, if, after publication, errors or omissions are identified that influence the interpretation of data. Changes after publication will take the form of an errata.

Retractions

Reviewers and Editors assume that authors report work based on honest observations. However, if there are substantial doubts about the honesty or integrity of the work, submitted or published, the editor will inform the authors of their concern, seek clarification from the sponsoring institution of the author and / or the employing

institution. Consequently, if they consider the published article to be fraudulent, the magazine PJCTVS will proceed with the retraction. If this method of investigation does not reach a satisfactory conclusion, the editor may choose to conduct his own investigation, and may choose to publish a note of concern about the conduct or integrity of the work.

Sponsorships

Advertising must not jeopardize the journal's scientific independence or influence editorial decisions and must comply with general and specific legislation in the area of health and medicine.

Final note - for a more complete explanation on this subject, we recommend reading the Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals by the International Committee of Medical Journal Editors), available at [http: // www. ICMJE.org](http://www.ICMJE.org)

B / Instructions to authors

The PJCTVS objective is the publication of original articles in the fields of Cardiac Thoracic and Vascular Surgery. The manuscripts will be reviewed by the Editors and by external reviewers, and their acceptance will depend on their scientific interest, originality and validity. The official language of the publication is English.

General rules

All articles must be prepared according to the “AMA Manual of Style”, 10th ed. and / or “Uniform Requirements for Manuscripts Submitted to Biomedical Journals”. The document must be written in English. Words in Latin or in a language other than the text must be placed in italics.

The components of the **Title Page** are: Title, Authors, Affiliation listing each institution with a number, e-mail of each author, Corresponding author and respective telephone contact. The total word count of the article and the category of publication to which the article is being submitted must be mentioned.

The components of the **Manuscript** are: Title; Abstract; Keywords (preferably MESH terms); Text; Conflict of Interest; Funding; Acknowledgments (if applicable); References; Legends (Figures and Tables).

No references to the authors should be made in the Manuscript to allow peer review to be double blinded. The pages of the manuscript should be numbered consecutively. The lines of the manuscript should also be numbered consecutively.

The submission must be done entirely in electronic format. The text file must be submitted in Word format, with numbered pages in the lower right corner, numbered lines on the left, Times New Roman font, size 12, double space and justified. The tables must be submitted in individual files, in Word format, Times New Roman font, size 12, single space, first column aligned to the left and the remaining columns centered. The images must also be submitted in individual files, in .TIFF (or JPEG), EPS (or PDF) format, with a minimum definition of 300dpi.

- Numbered page in the lower right corner
- Consecutive numbered lines in the left
- Letter - Times New Roman - size 12
- Double-spaced text, justified
- Title of the different sections should appear in bold and capital letters: Title, Abstract, Keywords, Text (including Introduction, Methods, Discussion, Conclusion), Acknowledgments, Conflict of Interest, Funding, Acknowledgments, References, Legends (of Figures and Tables).

Submission

Electronic submission of manuscripts must be at pjctvs.com. Only submissions that comply with the rules previously described are considered valid. After submission, the Editors will confirm the receipt of the manuscript with the corresponding author. In articles that are not originated by editorial invitation, the date of submission and the date of acceptance will be presented in the article.

Publication typologies

Article typology	Maximum word count*	Maximum n° of authors	Maximum n° of reference	Maximum n° of figures and tables
Original article	3500	8	40	8
Review article	4000	8	50-75	5
Clinical case	1000	5	10	4
Images in surgery	150 no additional legends	4	0	2
Letter to the editor	600	4	10	1
Editorial	1000	2	10	2

Table 1: Article typologies and their characteristics. * Excluding summary, references and legends of figures and tables.

The following categories of articles are accepted for publication (Table 1), and Editorials can only be submitted after invitation. The editorial board also reserves the possibility to invite the submission of articles of other typology. The word count must include abstract and legends, excluding references.

- Original articles

The Manuscript of an original article must be presented with the following sections: Title, Abstract, Keywords, Introduction (including Objectives), Material and Methods or Methods, Results, Discussion, Conclusion, Conflicts of Interest, Funding, Acknowledgments (if applicable), References, Legends of Tables and Figures. The Acknowledgments section is intended for all persons and/or institutions that collaborated in the realization of the article and who do not qualify as authors. Original Articles should not exceed 3500 words, excluding references and illustrations. It must be accompanied by illustrations, with a maximum of 8 figures/tables and 40 bibliographic references. The abstract of the original articles must not exceed 300 words and will be structured (with headings in bold and non capital letters: Introduction, Materials and Methods, Results and Conclusion).

- Review articles

They are intended to address, in depth, the current state of knowledge regarding important topics. Maximum length: 4000 words of text (not including abstract, captions and references). It cannot have more than a total of 5 tables and/or figures, and no more than 50-75 references. The abstract of review articles should not exceed 300 words and should be structured with the following headings in bold and non capital letters: Introduction, Methods, Results and Conclusion.

- Clinical cases

The report of a clinical case must have a clear justification for publication (rarity, atypical evolutions, therapeutic and diagnostic innovations, among others). The sections of a clinical case are: Title, Abstract, Keywords, Introduction, Clinical Case, Discussion, Conflict of Interest, Funding, Acknowledgments, References and Legends (Figures and Tables). The authorship of this type of articles should not exceed five authors. Other contributions can be recognized at the end of the text, under the subtitle “Acknowledgements”. The text must not exceed 1,000 words and 10 bibliographical references. The submission of illustrative figures is incentivized. The number of tables/figures must not exceed 4. Include an unstructured abstract not exceeding 150 words, summarizing the objective, main points and conclusions of the article.

- Images in Surgery

Images in Surgery is an important contribution to medical learning and practice. Images from physical examination, imaging, histopathology, surgery, etc. may be accepted. Up to two images can be sent per case. It must include a title and a text with a maximum of 150 words where relevant clinical information is given. Up to four authors are allowed. It must not have an abstract, figure legends or bibliographical references. Only original, high quality photographs that have not been submitted for publication are accepted. For information about digital images, see the “Technical guidelines for submitting figures, tables or photographs”.

- Recommendations or Clinical Guidelines

Medical societies, specialty colleges and official entities that wish to publish clinical practice recommendations within the scope of the specialties of Cardiac Surgery, Thoracic Surgery and/or Vascular Surgery, must contact the Editorial Board in advance and submit the full text and version to be published.

- Letters to the Editor

Letters to the Editor should be a critical commentary on an article published in PJCTVS or a short note on a topic or clinical case. The text should not exceed 600 words (excluding references and illustration captions), one illustration (table or figure) and 10 bibliographical references. No summary required. If it is a critical comment to a published article, they must follow a general structure: identify the article (becomes reference 1); justify your writing; provide evidence (from literature or from personal experience); provide a summary; cite references. Authors' answers must respect the same characteristics. If the Letters to the Editor refer to articles published recently, they have higher probability of acceptance.

- Editorials

Editorials will only be submitted by invitation of the Editor. These will be comments on current topics. They must not exceed 1000 words or contain tables/figures and will have a maximum of 10 bibliographic references. No need for a summary.

Required Documents

1. Cover letter – It must justify the interest in publishing the article in PJCTVS; the corresponding author should sign the letter in the name of all authors confirming that all meet authorship criteria; the contribution of each to the work must be specified.
2. Title page - This must include the Title without abbreviations and in capital letters; name and surname of the authors and the name(s) and location(s) of the Institution(s) of affiliation of each author. The name, telephone number and email of the corresponding author must be entered at the bottom of the title page.

- The total word count of the article must be mentioned. The category of publication to which the manuscript is being submitted must also be mentioned.
3. Manuscript - This must include Title, Abstract, Keywords (preferably MESH terms and up to a maximum of 6); Text; Conflict of Interest; Funding; Acknowledgments (if applicable), References; Legends (of Figures and Tables).
 4. Tables - must be numbered according to the sequence in which they appear in the text, and sent in a separate file from the manuscript text, in Word format. They must include the respective numbering. The first column must be left-aligned; the remaining columns must be aligned to the center. The abbreviations used in the tables must be defined in the table caption, even if previously defined in the text.
 5. Figures - must be numbered according to the sequence in which they appear in the text, and sent in individual files, in TIFF (or JPEG), EPS (or PDF) format, referencing the respective numbering and with a minimum definition of 300dpi.
 6. Twitter and/or LinkedIn - You may provide a brief statement (maximum 150 words) to answer the question "What does this study/review add to the existing literature and how it will influence future clinical practice" to increase your paper visibility (Altmetric). At the discretion of the editors, this statement may be placed at the beginning of the published article or used to promote the manuscript at social media.

Further details about the sections

Title

Frame a simple and concise title, choosing the words that are essential. Try to avoid abbreviations and any kind of dashes to separate title parts.

Abstract

The Abstract, being the most read section of all the articles, is essential. It must be factual, with no abbreviations (except International System units). It must be structured in: Objectives, problem under study or study objective; Methods, explaining how the study was carried out; Results, revealing the data found and its importance; and

Conclusion, revealing the conclusion of the study. The maximum word limit in the abstract is 250.

Text

The text should be organized in the following elements. Each of these sections must be identified in Capital letters.

- a) Introduction: must reveal the objective of the investigation and make a short bibliographic review of the state of the art in relation to the problem under study.
- b) Material and Methods/Methods: these should be described in detail with appropriate information on human or animal studies as noted above. The use of abbreviations should be limited to the units of measurement of the International System or to those in common use. Technologies should be named using their generic name, with the trade name and manufacturer's location in parentheses. The statistical techniques of data analysis must be described in detail, as well as the software used.
- c) Results: these should be considered the most important part of the article. As such, it is important that they are described concisely but simultaneously highlighting all results extensively.
- d) Discussion/Discussion and Conclusion: the discussion should be clear, brief, and should include the interpretation of the significance of the results and their relationship with other works published in the same area. The importance of the results and the methodological limitations, if any, must be stated.
- e) Interest conflicts: see above.
- f) Financing source if applicable.
- g) Acknowledgments: if they exist, they should be mentioned at the end of the text.
- h) References: must be presented sequentially according to the order of use in the text and presented as numbers above the line (for example, 1 or 2-6). Personal communications and unpublished data should not be included in the reference list, although they may be referred to in the text. References must use the Vancouver style. Whenever the article has more than five authors, the first 5 must be listed, followed by et al. In the references, all authors must be mentioned, and the newspapers or magazines presented according to the abbreviations used in Index Medicus. Whenever available,

the DOI must be presented at the end of the reference. Its formatting must follow the rules of the manuscript text (Times New Roman, size 12 and double spacing).

Examples:

Journals

1. Dinis da Gama A, Perdigão J, Ministro A, Evangelista A, Damião A et al. The utilization of the “simplified technique” in the simultaneous management of independent thoracic and abdominal aortic aneurysms. A clinical report. *RevPort Cir Cardiotorac V* 2009;3:149-155.

Books

1. Antunes M J. *A Doença da Saúde*. Lisboa: Quetzal 2001:167- 176. Vários Autores^[1]_{SEP}[3] Fragata J, Martins L. Como evitar o erro em Medicina. Em: Fragata J, Martins L, autores. *O Erro em Medicina*. Lisboa:Almedina, 2008:313-348. Publicações Online (O DOI é referência obrigatória e a única necessária para citações de artigos de publicações online)

Publicações Online (O DOI é referência obrigatória e a única necessária para citações de artigos de publicações online)

1. Azevedo O, Almeida J, Nolasco T, Medeiros R, Casanova J e al. Massive right atrial myxoma presenting as syncope and exertional dyspnea: case report.^[1]_{SEP}Cardiovascular Ultrasound doi:10.1186/1476-7120-8-23.

i) Legends of Figures and Tables: Figure and table captions must be mentioned in order in the main manuscript after the references, and numbered corresponding to the images and/or tables sent.

Manuscripts accepted for review

The revised manuscripts must be sent properly titled – revision1, revision2, etc, including new figures and tables if necessary. Comments from editors and/or reviewers should be discussed point-by-point in an attached letter and proposed changes discussed. Changes must be visible using Word's “track changes” function.

Supplementary material

Supplemental material such as applications, images, sound clips, videos can be published with the article to enhance it. Supplemental material is published exactly as submitted. Upon submission, this must be accompanied with a concise description of each item.

Submission Checklist

Make sure all of the following requirements are fulfilled before submitting your manuscript. Submissions may be returned to authors that do not adhere to these guidelines.

- One author is named corresponding author and her/his e-mail and phone contact are given.
- The article is original, it was only submitted for publication in the PJCTVS and it has not been published previously.
- The work complies with ethical and legal principles - it complied with the recommendations of the Declaration of Helsinki of the World Medical Association and was evaluated and approved by the ethics committee, if an original study.
- All authors meet authorship criteria, and everyone accepts responsibility for the validity of the data, that everyone read and had access to all study data, and all are in agreement with the content of the article and its submission to PJCTVS.
- All authors accept the assignment of copyright and agree to the availability of the manuscript in print or digital.
- Authors must declare potential conflicts of interest that could introduce bias or be seen as a bias in the conduct of their work in the manuscript.
- The work indicates the sources of funding if applicable.
- Manuscript is prepared as following: 12-point Times New Roman font, double-spaced and justified text, numbered page in the lower right corner, numbered lines to the left.
- The different sections of the manuscript are clearly identified: Title, Abstract, Keywords, Text (Introduction, Methods, Discussion, Conclusion), Conflict of

Interest, Funding, Acknowledgment, References, Legends (of Figures and Tables).

- Citations are in superscript without parenthesis and References are in Vancouver style.
- The images and tables are submitted as separate files.
- The submission adheres to the remaining requirements outlines in the Author Guidelines of the PJCTVS.

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