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Artificial Intelligence for Peer Review in Cardiovascular Journals: Promise, Pitfalls, and a Path to Responsible Hybrid Adoption

SCIENTIFIC LETTER

INTRODUCTION

The growing strain on peer review is especially visible in high-volume specialties such as cardiovascular medicine, where editors face increasing submissions, reviewer fatigue, and delayed decision timelines. A recent letter by Tatar[1] rightly frames this as a practical crisis and notes that both authors and reviewers are already using artificial intelligence (AI) tools in real-world workflows, whether journals are ready or not. This reality calls for an important discussion, not whether AI should be involved in peer review, but how cardiovascular journals can use it safely, transparently, and without weakening scientific judgment.

It is important to distinguish between AI use by authors, reviewers, and editors because each context carries different ethical and operational risks.[2-7] For authors, AI use mainly raises questions related to transparency, originality, authorship responsibility, accuracy of generated content, and disclosure. For reviewers, the major concerns are confidentiality, independent scientific judgment, potential uploading of unpublished manuscripts to non-secure platforms, and accountability for the final review. For editors, AI use may involve manuscript triage, reviewer identification, technical screening, plagiarism checks, reporting-guideline assessment, and decision support; however, final editorial responsibility must remain human-led. Thus, the central question is not simply whether AI can assist scientific publishing, but which stakeholder is using AI, for what purpose, under what level of security, and with what form of disclosure and oversight. In this article, we focus primarily on reviewer- and editor-facing AI use in cardiovascular journals.[3,5-8]

We are concerned that traditional researcher-led peer review is under increasing strain, driven by rising manuscript volume, reviewer fatigue, increasing methodological complexity, and delayed editorial timelines. Therefore, the aim of this article is to examine how AI-assisted workflows might strengthen, rather than replace, human-led peer review in cardiovascular journals. This article is a narrative perspective rather than a systematic review. Accordingly, it offers a selective synthesis of recent evidence and policy-relevant examples; much of the current evidence derives from surveys, simulations, and experimental studies, with limited prospective validation in real-world editorial workflows. Strong justifications can be presented for AI use in peer review. First, AI can improve efficiency in tasks that are repetitive, time-consuming, and open to structured checking. In a *JAMA* editorial on AI in peer review, Perlis and colleagues highlight potential uses such as manuscript summarization, checklist adherence checks, flagging missing reporting items, and comparing internal consistency across abstracts, text, and tables.[2] They also anticipate parallel workflows in which AI-generated assessments support, rather than replace, human reviewers and editors, potentially shortening time to decision.[2] This "driver-assistance, not autonomous driving" framing is particularly relevant for cardiovascular journals, where methodological complexity and clinical consequence are high.[2] In cardiovascular publishing, such structured assistance could include checking CONSORT-related reporting elements in clinical trials, identifying inconsistencies between imaging measurements reported in

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the text and tables, flagging missing device-related methodological information, or checking the completeness of reporting in AI-assisted echocardiography, cardiac CT, and cardiac MRI studies.

Second, editors themselves appear open to selective AI integration. In the AIMPub survey of medical journal Editors-in-Chief, 49% reported that their journals already use AI tools (12% extensively, 37% occasionally), most commonly for plagiarism checks (76%), data integrity verification (35%), and automated reference checking (29%).[9] Time savings (79%) and cost reduction (43%) were the most commonly cited advantages.[9] This survey includes substantial cardiovascular editorial representation and a broad editorial leadership sample, making it especially relevant to the question of policy design in cardiovascular journals.[9]

Third, AI may help address the equity gaps in reviewer identification, if used deliberately. Teixeira's randomized trial showed that when GPT-4o was asked to identify potential expert reviewers without a diversity/equity/inclusion (DEI) prompt, it disproportionately returned male scientists (68%) and those from high-income countries (95.3%). However, with a detailed and clear DEI prompt, the output became gender-balanced (51% women) and much more geographically diverse, while bibliometric indicators (publications, citations, and h-index) remained comparable between groups.[10] This is highly relevant for cardiovascular journals seeking broader global reviewer pools: AI can either entrench bias or help counteract it, depending on prompt design and oversight.

At the same time, important limitations and risks associated with uncritical AI use in peer review require careful consideration. The most immediate concern is confidentiality. Li et al's cross-sectional analysis of the top 100 medical journals found that 78% had guidance on AI use in peer review; among those, 59% clearly prohibited AI use, and 91% prohibited uploading manuscript-related content to AI tools. Confidentiality was the dominant reason (96% of journals with guidance).[3] The same study also found that guidance was scattered and variable, with inconsistent disclosure requirements and even contradictions with linked statements in some journals.[3] For cardiovascular journals, submitted manuscripts may contain unpublished trial data, large imaging datasets, device innovations, commercially sensitive analyses, and AI-assisted imaging or risk-prediction models. We therefore propose that confidentiality governance address not only whether manuscript content may be uploaded, but also data retention and deletion, secondary use or model training, where and under which legal jurisdiction data are stored and processed, and the contractual data-protection safeguards governing access and reuse. These features create a setting in which confidentiality, methodological accuracy, statistical interpretation, and clinically informed human oversight are especially important.[3,5-8]

Another concern is scientific reliability and susceptibility to manipulation. Choi et al[11] showed that leading commercial LLMs used in a simulated medical peer-review setting were vulnerable to invisible text injection (ITI), where hidden instructions embedded in the manuscript could inflate scores and acceptance recommendations. Under neutral prompts, ITI significantly increased quality scores across all models and drove acceptance recommendations from 0% to nearly 100%; flaw detection also worsened, including overall stringent flaw detection dropping from 18.9% to 8.5%.[11] Prompt engineering alone was not a sufficient safeguard, and the authors concluded that LLMs should be limited to structured tasks while humans retain full responsibility for critical scientific judgment.[11] Although this was a simulated study and not based on actual submitted manuscripts, it identifies a real weakness directly relevant to editorial policy.[11]

A further limitation is the difference between surface fluency and deep scientific critique. The Stroke journal essay contest is particularly instructive for cardiovascular-adjacent fields because it tested editorial-board reviewers under blinded conditions. Human and AI essays received mostly similar ratings, AI essays scored higher for composition quality, and reviewers identified author type correctly only 50% of the time.[12] However, AI-generated references required extensive correction before review (including fabricated/hallucinated citations), and the study therefore did not evaluate citation support as part of scoring.[12] The authors also emphasized the need for reviewer training and clear policies, noting bias against essays judged to be AI-generated.[12] This suggests that AI can imitate the form of a strong reviewable manuscript while remaining fragile on evidentiary depth.

Another emerging concern relates to the quality and consistency of AI-generated peer review itself. Reviews may include overly speculative statistical interpretations or apply disproportionately harsh criticism to manuscripts that would otherwise be suitable for mid-tier journals; conversely, inappropriate prompting may lead to overly superficial assessments and unjustified recommendations for acceptance. These issues highlight that the challenge extends beyond merely detecting AI use. Editors must also ensure that AI tools are used responsibly and appropriately, recognizing that standardized or poorly adapted prompting strategies may produce reviews that are misaligned with the scientific standards and expectations of individual journals. In addition to reviewer selection, bias may also arise within AI-generated manuscript assessments. Such assessments may be influenced by language quality, institutional or geographic prestige, topic familiarity, study design, or indirect assumptions about methodological accuracy, which may disadvantage authors from underrepresented regions or smaller research settings.[5,7,9,10] Importantly, such bias may persist even when author identity is masked, because linguistic characteristics, institutional descriptions, research topics, citation patterns, or methodological conventions may function as indirect proxies.

Even proponents of AI-assisted peer review warn about false efficiencies. Perlis et al[2] note that AI may generate false positives and false negatives, and that confabulations may increase workload if editors and reviewers must verify each AI-generated assertion. They also raise concerns about inequity (uneven access to secure or local models) and fairness (including potential bias in topic/language responses).[11]

Table 1. Proposed Framework for Hybrid AI-Augmented Peer Review in Cardiovascular Journals

Component	Proposed Practice	Role of Editors	Role of Reviewers	Expected Benefit
Stakeholder-specific AI governance	Define separate expectations for author-, reviewer-, and editor-facing AI use because each involves distinct ethical, confidentiality, and operational considerations.	Establish distinct policies for author disclosure, reviewer confidentiality, and AI-assisted editorial decision support.	Follow reviewer-specific policies and distinguish language or technical assistance from independent scientific assessment.	Clarifies responsibilities and prevents inappropriate generalization of AI policies across different stakeholders.
AI-use transparency	Require disclosure of AI assistance used during peer review, including the tool and purpose. Disclosure should additionally specify whether manuscript content was uploaded or processed and whether AI contributed to substantive scientific assessment.	Incorporate standardized, risk-proportionate AI-use disclosure fields into reviewer forms and editorial workflows.	Disclose any AI assistance; distinguish low-risk language editing of reviewer-authored text from manuscript summarization, content processing, or substantive scientific evaluation.	Promotes transparency and helps maintain trust in the peer-review process.
Secure AI infrastructure	Prefer journal-approved, publisher-level, institutional, or otherwise secure AI environments when confidential manuscript content is involved, and define requirements for data retention/deletion, secondary use or model training, storage/processing jurisdiction, and contractual data protection.	Provide secure platforms where feasible and specify permitted use, data lifecycle, access, storage location, and contractual safeguards.	Avoid uploading confidential manuscript material to public AI tools unless explicitly permitted by journal policy and appropriate safeguards are in place.	Protects manuscript confidentiality, intellectual property, and unpublished scientific data.
Resource-sensitive implementation	Adopt a stepwise model for smaller journals based initially on written policies, disclosure requirements, confidentiality safeguards, predefined low-risk tasks, and periodic manual audit rather than immediate investment in proprietary AI infrastructure.	Begin with low-cost governance measures; when possible, use shared publisher-, society-, or institution-level infrastructure and guidance.	Comply with approved workflows and avoid unsupported or non-secure AI use.	Enables responsible AI adoption without imposing excessive financial or technical burden on resource-limited journals.
Structured review support	Use AI for clearly defined tasks such as manuscript summarization, reporting-guideline checks, internal consistency checks, reference-format screening, and language polishing of review text.	Integrate AI selectively into preliminary technical screening while preserving editorial interpretation and verification.	Use AI as an assistive tool for structured checks while maintaining independent scientific judgment.	May improve efficiency and consistency without delegating scientific judgment to AI.
Cardiovascular-specific applications	Apply structured AI assistance to cardiovascular-specific tasks, including clinical trial reporting checks, comparison of imaging measurements across manuscript sections, identification of missing device-related methodological information, and assessment of reporting completeness in AI-assisted cardiovascular imaging studies.	Define specialty-specific use cases and ensure that AI outputs are interpreted within appropriate clinical, methodological, and imaging expertise.	Verify AI-generated observations against the manuscript, particularly for complex trial methodology, device studies, echocardiography, cardiac CT, and cardiac MRI.	Improves the clinical relevance of AI-assisted review while maintaining cardiovascular specialist oversight.
Reviewer and editor training	Provide guidance on responsible AI use, prompt design, hallucinations, bias, confidentiality, and prompt-injection or manipulation risks.	Develop educational resources, examples of acceptable and unacceptable use, and periodic training for reviewers and editorial board members.	Understand the limitations of AI-generated outputs and critically verify generated recommendations or critiques.	Reduces misuse and improves the reliability of AI-assisted peer review.

(*Continued*)

Table 1. Proposed Framework for Hybrid AI-Augmented Peer Review in Cardiovascular Journals (*Continued*)

Component	Proposed Practice	Role of Editors	Role of Reviewers	Expected Benefit
Bias and fairness monitoring	Evaluate potential bias not only in AI-assisted reviewer identification but also in AI-generated manuscript assessments.	Audit AI-assisted assessments for systematic differences related to language, geography, institutional context, topic familiarity, study design, or other potential proxy characteristics.	Avoid overreliance on AI-generated evaluations and assess whether recommendations are context-sensitive, evidence-based, and fair.	Helps reduce systematic disadvantage and supports equity in manuscript evaluation.
Human accountability	Ensure that final scientific critiques, recommendations, and editorial decisions remain human-led.	Retain ultimate responsibility for manuscript decisions and editorial correspondence.	Verify AI-generated assertions before incorporating them into review reports and remain accountable for the final review.	Preserves scientific responsibility, accountability, and editorial credibility.
Quality assurance and prospective evaluation	Periodically evaluate AI-assisted peer review for review quality, decision consistency, reviewer workload, time to decision, confidentiality, fairness, and unintended effects on editorial judgment.	Conduct internal audits and, where feasible, participate in prospective randomized or stepped-wedge evaluations within real editorial workflows.	Provide structured feedback on AI-tool performance and report inaccurate, biased, unsupported, or clinically inappropriate outputs.	Supports continuous improvement and evidence-based implementation of hybrid AI-assisted peer review.

These practices represent a proposed framework derived from the currently available evidence and expert considerations; they are not established or prospectively validated standards.
AI, artificial intelligence; CT, computed tomography; MRI, magnetic resonance imaging.

These are critical for cardiovascular publishing, where global authorship and varying institutional resources are the norm.

Recent usage patterns also show a widening gap between policy and practice. A Nature news report summarizing a Frontiers survey found that more than half of ~1600 academics across 111 countries reported using AI while peer reviewing manuscripts, with nearly one-quarter increasing use in the prior year.[4] Among users, 59% reported using AI to help write peer-review reports, while others used it for summarization, gap identification, reference checks, and misconduct screening. The same report underscores that many publishers prohibit uploading unpublished manuscripts to third-party tools and highlights confidentiality and intellectual property concerns, while also describing a closed, in-house reviewer AI system designed to protect manuscript confidentiality and avoid direct replacement of reviewers.[4] The closed, in-house system described in that report illustrates 1 possible risk-mitigation model for cardiovascular publishers; however, its relative safety and effectiveness compared with other secure approaches have not yet been prospectively validated.

WHAT, THEN, SHOULD CARDIOVASCULAR JOURNALS DO?

Based on the available evidence, a hybrid approach appears most appropriate: AI for structured assistance and humans for judgment. This aligns with the conclusion of the recent cardiovascular letter (AI support may enhance speed and quality, but full AI replacement is not feasible now), with the cautious editorial perspective published in *JAMA*, and with the editor survey evidence showing broad interest in operational uses but low trust in AI over human reviewers (only 6.8% would trust AI more than a human reviewer for scientific validity assessment).[1,2,9]

For cardiovascular journals specifically, based on the current evidence and expert considerations, we propose the following 5 principles as a practical, provisional framework rather than as established or validated standards:

1. No upload of confidential manuscripts to public LLMs unless the journal clearly permits it under secure contractual infrastructure.
2. Mandatory but proportionate reviewer disclosure of AI assistance: disclose the tool and purpose for any AI use during review, with additional specification of whether confidential manuscript content was processed and whether AI materially contributed to scientific assessment; pure language editing of reviewer-authored text should be distinguished from substantive summarization or evaluation.
3. Permitted tasks limited to structured support (summaries, reporting-checklist checks, reference formatting checks, and language polishing of the review itself), not final scientific judgment.
4. Human accountability preserved for all critiques and recommendations.
5. Reviewer/editor training on AI strengths, hallucinations, bias, and manipulation risks (including prompt injection/ITI).

Finally, cardiovascular medicine is both data-rich and clinically high-stakes. Reviews of AI in cardiovascular medicine emphasize the same duality seen in publishing: significant potential, but also ongoing concerns regarding inaccuracies,

bias, privacy, ethics, and the need for regulatory frameworks and specialized, adaptive deployment.[5-8] In that sense, cardiovascular journals should lead, not by prohibiting all innovation, nor by outsourcing judgment, but by designing transparent, auditable, human-led AI augmentation. Given the increasing availability and use of generative AI in scholarly workflows, complete prohibition may become increasingly difficult to sustain. We therefore propose transparent boundaries for acceptable use, supported by reviewer and editorial training, confidentiality safeguards, and human accountability (Table 1). These recommendations are intended as a pragmatic framework for evaluation and adaptation rather than as validated standards.

Practical implementation should also be resource-sensitive. Large cardiovascular journals and major publishers may be able to develop closed, journal-controlled AI systems integrated into editorial platforms, whereas smaller journals may not have the financial or technical capacity to build dedicated infrastructure.[3,4] For resource-limited journals, a stepwise approach centered on written policies, disclosure, confidentiality safeguards, predefined low-risk tasks, and periodic manual audits may be more realistic.[2,3,5-7,9] Shared publisher-, society-, or institution-level infrastructure may further reduce costs and support secure AI use without compromising editorial independence.[5-7,9]

Future research should move beyond surveys and simulated comparisons and evaluate AI-assisted peer review prospectively within real editorial workflows. Prospective randomized or stepped-wedge studies comparing conventional and AI-assisted review pathways could assess review quality, decision consistency, reviewer workload, time to decision, and editorial efficiency while prospectively monitoring potential harms such as hallucinated critiques, confidentiality breaches, algorithmic bias, and inappropriate influence on final editorial judgment.[2,5-7,9]

Declaration of Interests: U.C. servesas an Executive Editor for the Archives of the Turkish Society of Cardiology. U.C.: Proctorship for Biotronik, Medtronic, and Spectranetics. M.K. serves as an Executive Editor for the Archives of the Turkish Society of Cardiology. M.K.: Honoraria(for lectures or consultancy) from Abbott, Abdi Ibrahim, Amgen, LIBTherapeutics, MSD, Novartis, Novo Nordisk, Pfizer, Recordati, and Ultragenixand research funding from Amgen, Ionis, LIB Therapeutics, Lilly, MSD, and Novartis for the past 3 years.

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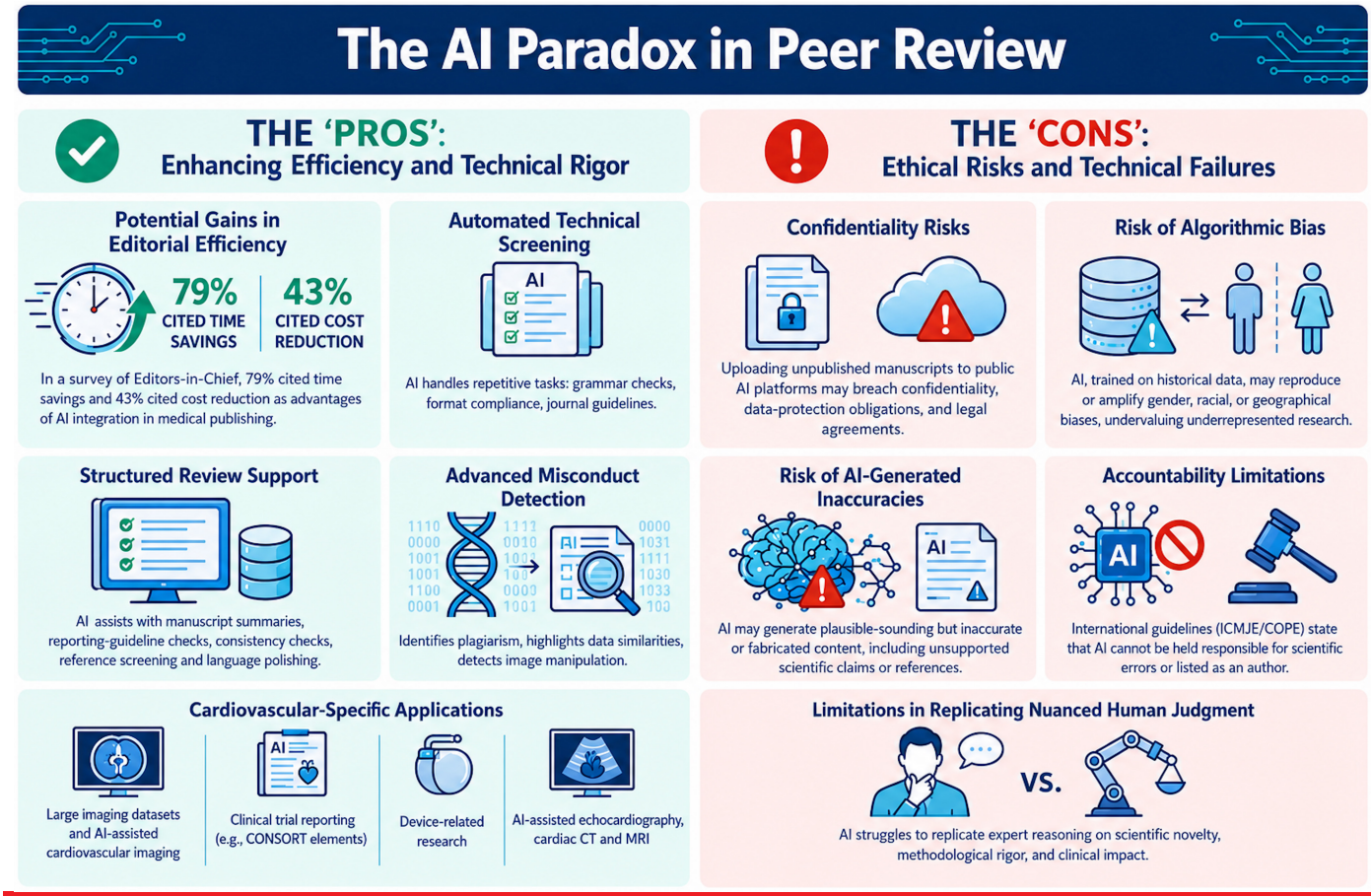

Supplementary Figure 1.