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ORIGINAL ARTICLE

Reporting guidelines for surgical technique could be improved: a scoping review and a call for action

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Abstract

Objectives: To identify reporting guidelines related to surgical technique and propose recommendations for areas that require improvement.

Study Design and Setting: A protocol-guided scoping review was conducted. A literature search of MEDLINE, the EQUATOR Network Library, Google Scholar, and Networked Digital Library of Theses and Dissertations was conducted to identify surgical technique reporting guidelines published up to December 31, 2021.

Results: We finally included 55 surgical technique reporting guidelines, vascular surgery (n = 18, 32.7%) was the most common among the clinical specialties covered. The included guidelines generally showed a low degree of international and multidisciplinary cooperation. Few guidelines provided a detailed development process (n = 14, 25.5%), conducted a systematic literature review (n = 13, 23.6%), used the Delphi method (n = 4, 7.3%), or described post-publication strategy (n = 6, 10.9%). The vast majority guidelines focused on the reporting of intraoperative period (n = 50, 90.9%). However, of the guidelines requiring detailed descriptions of surgical technique methodology (n = 43, 78.2%), most failed to provide guidance on what constitutes an adequate description.

Conclusion: Our study demonstrates significant deficiencies in the development methodology and practicality of reporting guidelines for surgical technique. A standardized reporting guideline that is developed rigorously and focuses on details of surgical technique may serve as a necessary impetus for change. © 2022 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Keywords: Surgery; surgical technique; reporting guideline; methodology; quality control; scoping review

1. Introduction

Surgical technique is delicately described as the essential component of the craft and art of surgery [1]. However many studies published over the years have not provided sufficient technical detail to permit the duplication of the investigators' efforts [2−4], which further subverts the hard work needed to set up and conduct a new study. This problem is further exacerbated by the sophisticated nature of contemporary surgical practice, which involves a series of steps, team cooperation, availability of facilities, and unexpected variations [2,5]. A recently published systematic review of 16 case reports found that the reporting of surgical techniques for minimally invasive transthoracic liver resections is poor, due to a lack of full description of technique details, patient selection, and governance procedures [6]. The results of previous reviews show that the extremely low standard of reporting leaves readers with an incomplete picture of how surgical techniques are performed which hampers statistical comparisons between studies [7,8].

Reporting guidelines are a relatively new phenomenon but evidence of their positive influence on the quality of published research reports is already emerging [9,10]. As of March 2022, there were 497 reporting guidelines categorized by the Enhancing the QUAlity and Transparency Of health Research (EQUATOR) network [11]. However the potential of surgical technique reporting guidelines to improve the quality of research publications is not being fully realized. One systematic review showed that 120 out of 193 surgical journals (62%) did not issue any reporting guidelines in their instructions to authors [12]. Among the 38% of journals that did recommend using reporting guidelines, the focus was limited to guidelines specific to article types, such as Consolidated Standards of Reporting Trials (CONSORT) for randomized controlled trials, with no specific instruction on methodology for reporting

What is new?

Key findings

- Many surgical technique reporting guidelines have been published, covering a broad spectrum of clinical specialties.
- For most reporting guidelines the developers have failed to describe how the guidance was developed, and the level of detailed description they require to make the surgical technique more reproducible is low.

What this adds to what is known?

- Standardized and transparent reporting of surgical technique is the cornerstone of effective dissemination and implementation. However the reporting of surgical technique in the literature is currently inadequate. We found the development methodology and clinical practicality in the current guidelines that assist with the reporting of surgical technique has a large potential for improvement.

What is the implication, what should change now?

- Surgical technique reporting guideline developers need to optimize how their guidelines are developed and implemented, and provide more structured information on how details of surgical technique and factors contributing to outcome variations should be reported in the future.

surgical technique. Other studies have produced similar findings [13,14], and the endorsement of reporting guidelines in surgical journals has not improved over time [15]. Reasons for the failure to use a reporting guideline may include a lack of suitable reporting guidelines, difficulties in using existing guidelines, and poor awareness of the matter among authors, journal editors, and reviewers.

As of March 2022 over 41,000 articles could be identified using the search term ‘‘surgical technique’’ [Title/Abstract] in PubMed [16]. However no clear definition of surgical technique is currently provided in the literature or medical dictionaries. In our recently published study [17], we defined surgical technique as ‘‘the specific way and skills of performing a particular medical operation’’. This definition specifically focuses on intraoperative implementation rather than perioperative care. To date no study has reviewed the reporting guidelines for surgical technique. Such a review is important, because the results can provide an understanding of factors that influence their successful implementation from the perspective of guideline itself.

Therefore, we undertook this scoping review to describe (i) the current situation and (ii) the development process, and to identify (iii) the specific requirements and concerns of items related to surgical technique, with a view to proposing recommendations for areas requiring improvement.

2. Materials and methods

This scoping review was conducted in accordance with the Joanna Briggs Institute Reviewers’ Manual [18] and our preexisting protocol [17]. We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) checklist to guide the reporting [19] (Supplementary Table S1). This study is not registered as there is no specific platform for registration of a scoping review.

2.1. Search strategy

An extensive search strategy was designed to retrieve reporting guidelines relating to surgical technique published up to December 31, 2021 from four electronic sources: MEDLINE (via PubMed), the EQUATOR Network Library (https://www.equator-network.org/), Google Scholar (https://scholar.google.com/), and the Networked Digital Library of Theses and Dissertations (http://search.ndltd.org/index.php). The search strategy included the terms ‘‘reporting guideline’’ AND ‘‘surgical technique’’ and was refined several times before the implementation. Search results were independently assessed by two reviewers (Q.L.S. and Y.F.M.); disagreements were resolved through consensus or by referral to a third reviewer (Y.L.C).

2.2. Inclusion and exclusion criteria

All English-language reporting guidelines related to surgical technique in human patients were included. There were no restrictions on clinical specialty, publication type (including journal articles and grey literature), or location. In this review, we followed the same definition of surgical technique from our published protocol (the specific way and skills of performing a particular medical operation) [17], which covers operations that remove abnormalities, repair affected parts or implant substitutions by cutting open, whether invasive, minimally invasive, or noninvasive. Duplicates and previous versions of updated reporting guidelines were excluded.

2.3. Study selection and data extraction

The reporting guideline selection process and data extraction were conducted by two independent groups (group 1: Q.L.S. and X.Z.Z.; group 2: Y.F.M. and P.P.J.). After the elimination of duplicates, all titles, abstracts, and full texts were screened to identify eligible reporting guidelines using the predefined criteria. Disagreements

were resolved by consensus. Prior to the formal study selection, a pilot of 100 random sample records was conducted until sufficient agreement was reached between the four reviewers.

The original data extraction form proposed in the protocol was modified to allow capture the most relevant aspects of the included reporting guidelines (Supplementary Table S2). Before the formal data extraction, the form was piloted on a random sample of four of the included reporting guidelines to achieve 100% agreement for each item among the four reviewers. Disagreements were resolved through discussion and consensus.

2.4. Data analysis

We first conducted a descriptive analysis of basic characteristics of the reporting guidelines. We then screened 17 methodology-related items (Supplementary Table S2) from the recommended development steps by the EQUATOR [10], and classified them into four sections: initial, premeeting, postmeeting, and postpublication. Each item was scored according to the authors' report as the following: (i) adequate−the activity was completely done; (ii) inadequate−the activity was not done; (iii) not reported−no information relating to the activity; (iv) unclear−unable to determine whether the activity had been done or not. Thirdly we analyzed the recommended items by these reporting guidelines from nine aspects of surgical technique (Supplementary Table S2). These nine aspects were discussed and determined by our members from multiple disciplines [17], including surgeons, methodologists, and journal editors, which covered whether authors are required to provide a detailed description of the surgical technique and other information such as surgical team, instruments or supports, and images or videos. Finally we used a bubble plot to provide an overall description of the whole number, clinical specialties, methodological processes of existing reporting guidelines, and their required items relating to surgical technique. For the methodological process we scored the included guidelines as very low, low, moderate, and high (defined as reporting 1−5, 6−10, 11−15, and 16−17 of the 17 methodology-related items); and for the recommended items of surgical technique, we scored the guidelines as low, moderate, and high (defined as containing 1−3, 4−6, and 7−9 of the nine aspects). One reviewer (Q.L.S.) conduced the scores, which was cross checked by a reviewer (Y.F.M.). Microsoft Excel 2019 was used for all data management and analyses.

3. Results

3.1. Search results

The literature search identified 4,717 records for screening, of which 652 were excluded as duplicates. The title and abstract screening was conducted for 4,065 articles; 3,887 articles were subsequently excluded because they were unrelated to surgical technique reporting guidelines. The full texts of the 178 remaining records were retrieved for further evaluation, and 55 reporting guidelines related to surgical technique were ultimately included for data extraction and analysis (Fig. 1; Supplementary Table S3).

3.2. Characteristics of surgical technique reporting guidelines

The basic characteristics of the included reporting guidelines are presented in Table 1. More than half of the reporting guidelines were led by authors from the United States of America (n = 35, 63.6%) and published before 2010 (n = 29, 52.7%; Fig. 2). The median number of authors was 10 per guideline. In terms of focus, the 55 eligible guidelines were extremely diverse, ranging from well-known general guidelines for reporting the results of specific types of research studies, such as the Surgical CAse REport guidelines for surgical case reports [20], to the first attempts to harmonize reporting of a particular surgical technique, such as reporting standards for lower extremity arterial endovascular procedures [21]. Regarding the development background, 40 (72.7%) guideline groups started their work from scratch, while others (n = 15, 27.3%) adapted existing guidelines for a new or more specialized research field. We encountered a variety of terms used for reporting guidance across the literature, the most common was "reporting standard(s)" (n = 29, 52.7%), followed by "reporting guideline(s)" (n = 11, 20%). The median number of citations per reporting guideline was 37, with the range being 2−4,528 citations.

Four guidelines were targeted for all specialties of surgery. The remaining guidelines designed for specific clinical specialties covered 11 specialties, with vascular surgery being the most common focus (n = 18, 32.7%). Forty-five (81.8%) guidelines were focused on the reporting of a specific surgical technique.

3.3. Reporting guideline development process

A detailed description of the development process was provided for 14 (25.5%) guidelines. Only one guideline reported following the guidance recommended by the EQUATOR. Figure 3 shows that developers generally provided little information about the development process. Of the 17 steps that were screened, 14 were reported in less than 25% of included guidelines.

3.3.1. In the initial steps

For 13 (23.6%) guidelines, the development process included a review of the literature. These included searching for existing relevant guidance (n = 3, 5.5%) and evidence on the reporting quality of published articles (n = 11, 20%). Funding was obtained for the development

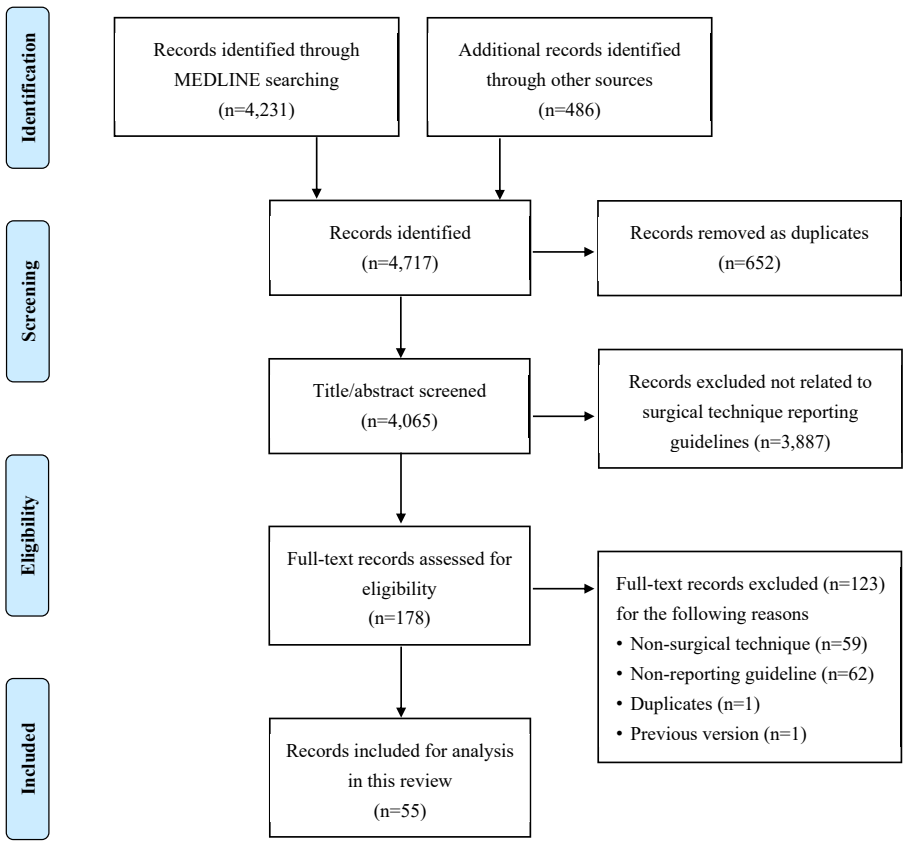

Fig. 1. Flow of articles through scoping review. A total of 4,717 records from MEDLINE and additional sources were included in the initial search, and 55 studies were finally included after full-text screen.

of one (1.8%) guideline. Conflicts of interest were reported for 24 (43.6%) guidelines, while 23 (41.8%) guidelines had none declared.

3.3.2. In the premeeting activities

A clear description of the development team was provided for 6 (10.9%) guidelines. Other information provided included specialty (n = 44, 80%), country (n = 46, 83.6%), and people unsigned as authors (n = 23, 41.8%). In terms of international cooperation, 21 (38.2%) guidelines involved participants from only one country. In terms of multidisciplinary participation, content experts were involved in 83.6% (n = 46) of guidelines, while methodologists and editors were involved in 3 (5.5%) and 4 (7.3%) guidelines, respectively.

3.3.3. In the postmeeting activities

Thirty-one (56.4%) guidelines summarized their reporting recommendations in the form of checklist. The developers of only one guideline reported that they had conducted a pilot test. None of the guidelines had developed a separate explanatory document or described their publication strategy.

3.3.4. In the postpublication activities

The developers of 6 (10.9%) guidelines simply described their postpublication plans. For 2 (3.6%) guidelines, the developers planned to establish feedback dialogues through social media and seek user advice. Guideline endorsement approaches included facilitating their use through instruction to authors, seeking support from authoritative bodies, and efforts by editors and reviewers, or authors citing and following the guideline in their methods. One (1.8%) guideline reported that a prepost survey of relevant studies would be conducted in the future.

3.4. Surgical technique related items recommended to report by the included guidelines

We analyzed the 55 guidelines to identify reporting items related to surgical technique, and the results are presented in Figure 4 and Supplementary Table S4.

3.4.1. Before the performance of the surgical technique

Descriptions of preoperative evaluation and management were required by 35 (63.6%) and 27 (49.1%) guidelines, respectively. Preoperative management included patient optimization, concurrent treatments, and supportive

Table 1. Characteristics of surgical technique reporting guidelines included in scoping review

Category	Number (percentage)
Year of publication	
1993–2010	29 (52.7)
2011–2021	26 (47.3)
Country of origin	
United States of America	35 (63.6)
United Kingdom	7 (12.7)
Belgium	2 (3.6)
Germany	2 (3.6)
Italy	2 (3.6)
Switzerland	2 (3.6)
Others[a]	5 (9.1)
Coverage of surgical technique aspects[b]	
Preoperative	48 (87.3)
Intraoperative	50 (90.9)
Postoperative	54 (98.2)
Specialty	
All specialties of surgery	4 (7.3)
Vascular surgery	18 (32.7)
General surgery	7 (12.7)
Oncology	7 (12.7)
Neurosurgery	5 (9.1)
Urinary surgery	4 (7.3)
Cardiac surgery	3 (5.5)
Gynecology and obstetrics	3 (5.5)
Cardiology	1 (1.8)
Plastic surgery	1 (1.8)
Spine surgery	1 (1.8)
Thoracic surgery	1 (1.8)
Developers	
Societies/associations	24 (43.6)
Working group with a specific name	21 (38.2)
Working group with no specific name	1 (1.8)
Individuals	9 (16.4)
Development background	
New reporting guidelines	40 (72.7)
Update of existing guidelines	10 (18.2)
Building on existing guidelines	5 (9.1)
Focus of reporting guidelines	
Study design not specified	45 (81.8)
Clinical trials	4 (7.3)
Case series	3 (5.5)
Multiple study designs	1 (1.8)
Observational study	1 (1.8)
Case reports	1 (1.8)
Republished since the first publication	
Yes	10 (18.2)
Indexed by the EQUATOR network	
Yes	37 (67.3)
Total citation count[c]	
$N \geq 100$	18 (32.7)
$N \geq 1{,}000$	4 (7.3)

Abbreviations: EQUATOR, Enhancing the QUAlity and Transparency Of health Research.

[a] Others included Barbados ($n = 1$), Canada ($n = 1$), Greece ($n = 1$), Lebanon ($n = 1$), Sweden ($n = 1$).

[b] 47 reporting guidelines covered all surgical technique aspects of preoperative, intraoperative, and postoperative.

[c] Total count includes citations of previous published version and updated version (if applicable).

care taken prior to the surgical procedure. Descriptions of anesthesia, patient position, and the operative location or approach were required by 22 (40%), 8 (14.5%), and 17 (30.9%) guidelines, respectively.

3.4.2. *During the performance of the surgical technique*

Of 43 (78.2%) guidelines that required detailed descriptions of the surgical technique methods, 17 (30.9%) requested only precise technical details with no further instructions, 5 (9.1%) required detailed descriptions for accurate reproduction by other researchers, and 1 (1.8%) required a description of all procedural steps, rationale for the choice of procedure, and the procedural endpoints. Of the guidelines that required the provision of adequate details, most did not have a clear structure. Examples can be found in Box 1.

Thirty-eight (69.1%) guidelines required the reporting of intraoperative patient management. This included pharmacologic therapy (e.g., duration, concentration, dosage, routes of administration, and medications that cannot be given concurrently), need for transfusion, adjunctive procedures, methods, and the frequency of patient safety monitoring, and imaging guidance. The duration of the surgical technique was required to be reported by 31 (56.4%) guidelines.

3.4.3. *After the surgical technique is performed*

Postoperative management or follow-up was required to be outlined by 47 (85.5%) guidelines. Details included when, where, and how the patients were followed up, the results of patient follow-up, and whether there were any specific postoperative instructions or auxiliary care.

Forty-seven (85.5%) guidelines required a description of outcomes at the technical, clinician-assessed, or patient-reported levels; among these guidelines, 2 (3.6%) recommended that the patient's perspective on the intervention(s) they received should be reported, when appropriate. Twenty (36.4%) guidelines included the requirement to report changes during the technique process with rationale. Six (10.9%) required the reporting of risk factors for adverse surgical outcomes.

Documentation of complications was required by 50 (90.9%) guidelines. Four guidelines (7.3%) used the term

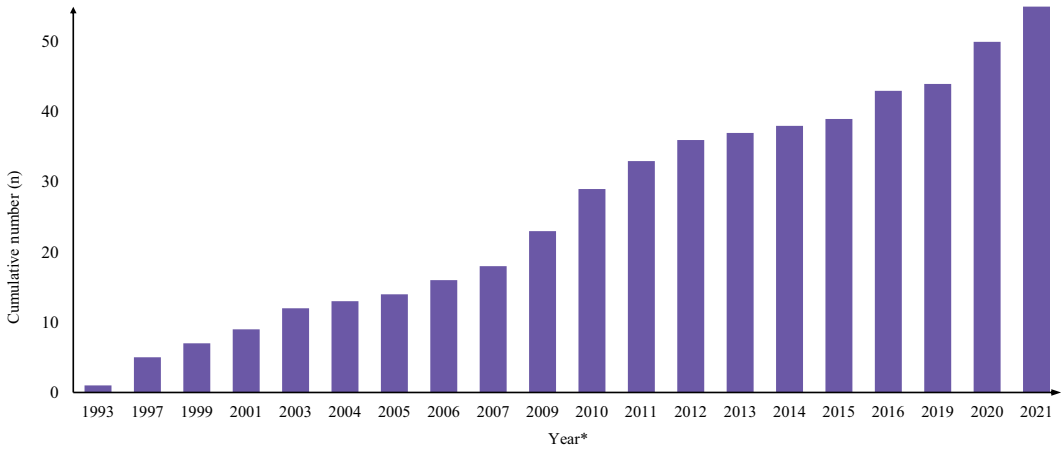

Fig. 2. Cumulative number of surgical technique reporting guidelines from 1993 to 2021. The total number of surgical technique reporting guidelines is increasing. *No surgical technique reporting guidelines were published in 1994−1996, 1998, 2000, 2002, 2008, or 2017 to 2018.

"perioperative", 11 (20%) explicitly required the reporting of "intraoperative" and "postoperative" complications, and 6 (10.9%) only required the reporting of postoperative complications. Twenty-six (47.3%) guidelines required that authors distinguish between procedural complications and those not related to the procedure.

3.4.4. Additional items related to surgical technique

We classified additional items related to surgical technique into the following categories: reasoning (n = 5, 9.1%), and purpose (n = 2, 3.6%) for choosing the technique; target population (n = 38, 69.1%); technical type (n = 1, 1.8%); feasibility (n = 1, 1.8%); surgical stage (n = 3, 5.5%); tissue specimen handling (n = 1, 1.8%); and cost (n = 16, 29.1%).

3.4.5. Items to make the surgical technique more reproducible

Details of the person/team performing the surgical technique included the number of operators and their position, specialization, experience, and training received. A description of or reference to a statistical learning curve assessment was also recommended (n = 4, 7.3%). Regarding the instruments or supports, most are items related to describing the device, including their name, model, manufacturer, mechanism of action, reason for being chosen, methods of use, and whether they are available for routine use. Others are related to the use of a tourniquet, sutures, catheters, or relevant equipment, materials, and systems along with their type, size, diameter, length, volume, pressure, duration of application, and so on.

Regarding quality assurance 6 (10.9%) guidelines required the reporting of specific measures taken to reduce variation, ensure quality, and maintain consistency in the delivery of the surgical technique at the individual or institutional level. Two (3.6%) guidelines required authors to report any precautionary measures taken to prevent misoperations. Among the guidelines that required the reporting of strengths and weaknesses, 4 (7.3%) focused on innovation. Two (3.6%) guidelines required the reporting of improvement plans or insight for the future of the surgical technique used.

3.5. Mapping of existing surgical technique reporting guidelines

Figure 5 displays the 55 reporting guidelines as bubbles. The results show that the vast majority guidelines scored very low for methodology (n = 48, 87.3%; based on reporting) and low for technique items (n = 29, 52.7%). The Idea, Development, Exploration, Assessment, Long-term study (IDEAL) recommendations scored high for methodology and for required items related to surgical technique [23].

4. Discussion

4.1. Principal findings

Through this scoping review, we found that there is no shortage of reporting guidelines related to surgical technique and that the existing guidelines have broad disciplinary coverage. However several challenges remain regarding the development methodology and item details of guidelines.

4.2. Study implications for research and practice

First the developers of the included reporting guidelines rarely followed the methodology recommended by Moher et al. [10], and failed to provide sufficient details on many processes. For example, a systematic literature search is essential to determine whether there is a need to develop a new reporting guideline [9,10]. We found that parallel development of several surgical technique reporting guidelines on the same clinical topic is common, even within the

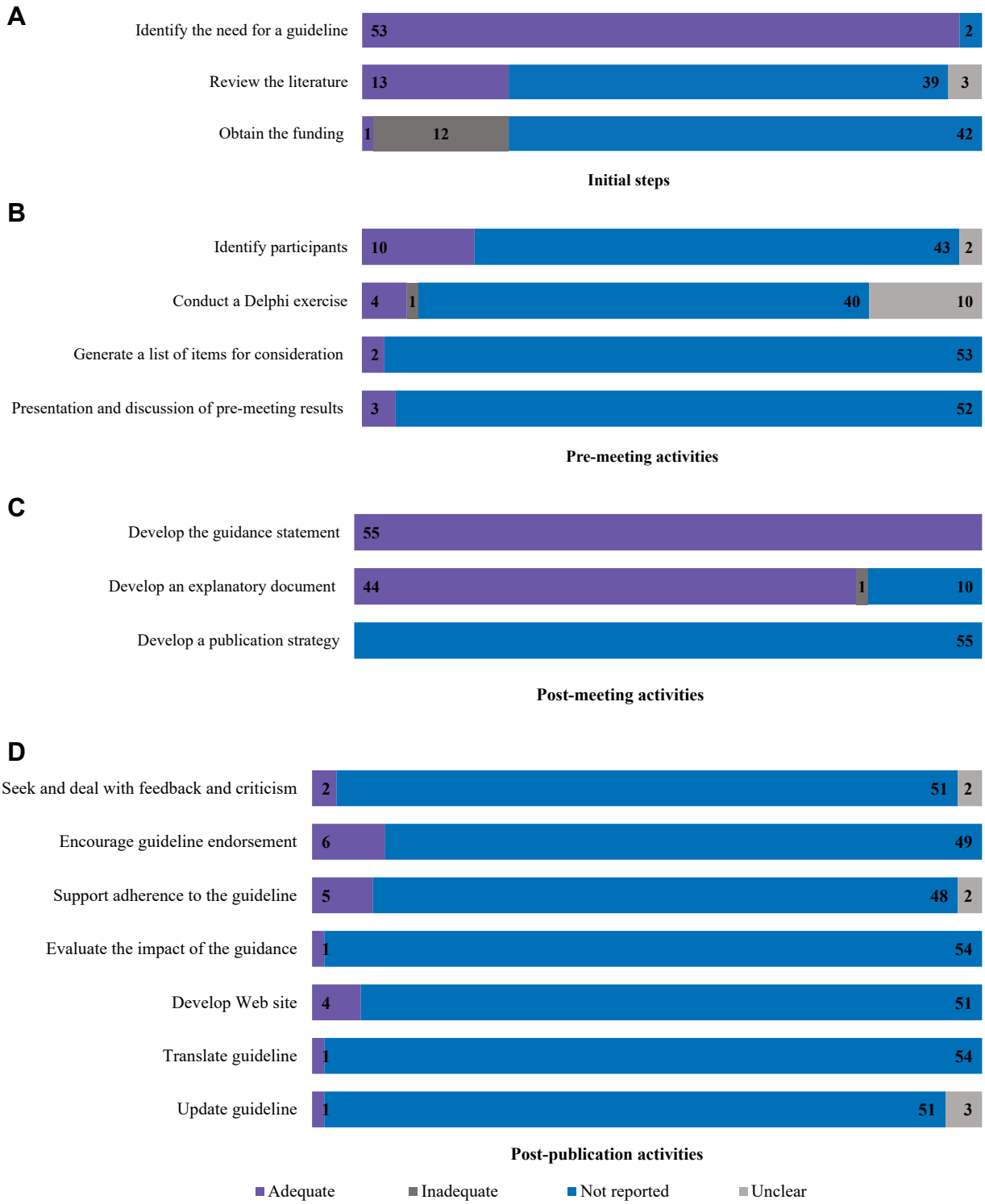

Fig. 3. Steps in the development of the surgical technique reporting guidelines (A–D). Of the 17 steps that were screened, 14 were reported in less than 25% of included guidelines. *(i) Adequate: the activity was completely done according to the report; (ii) Inadequate: the activity was not done according to the report; (iii) Not reported: no information relating to the activity was provided by the reporting guideline; (iv) Unclear: unable to determine if the activity had been done or not.

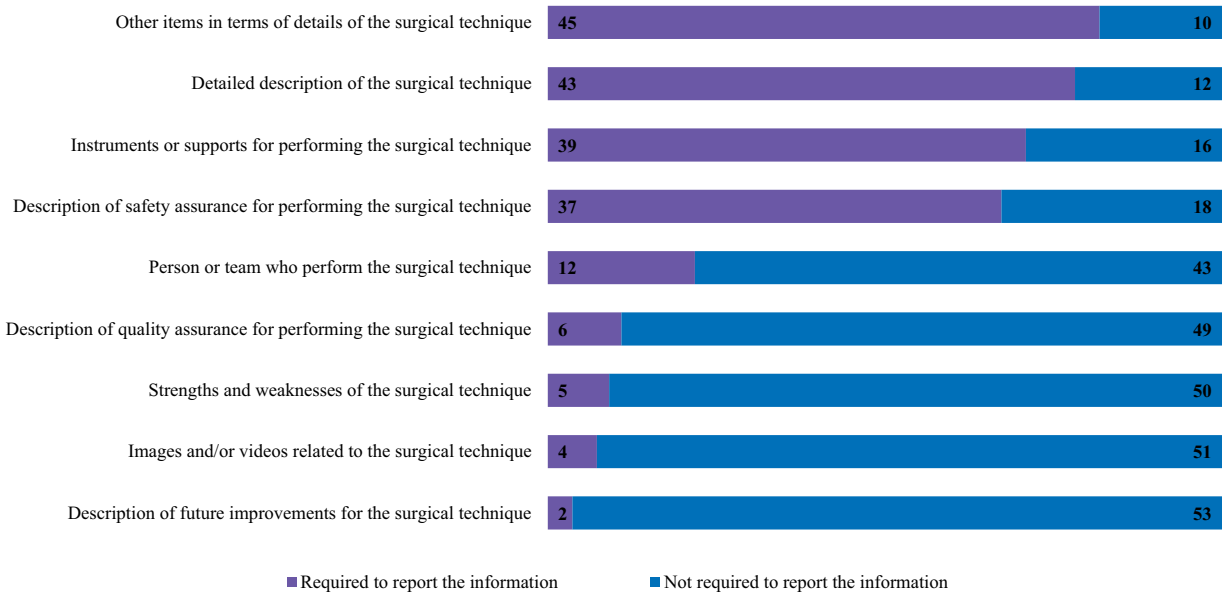

Fig. 4. Items related to surgical technique in the reporting guidelines. We analyzed reporting items related to surgical technique from nine aspects, including whether authors are required to provide a detailed description of the surgical technique and other information such as surgical team information, instruments or supports, and images or videos. The results showed that the level of detailed description that the included reporting guidelines require to make the surgical technique more reproducible is low.

same country. Examples can be found in thoracic endovascular aortic repair and bariatric surgery [26−30]. We also found that authors from the USA dominated the development of more than 60% of the reporting guidelines. This is unsurprising, but different audiences (e.g., health care providers, nurses, patients from high-, middle-, and low-income countries) view, define, and perceive what should be reported differently [9,10]. More than one-third of guidelines in this review were developed by researchers from a single country, and the engagement of methodologists and editors was very poor. It is clear that some perspectives may have been missed. Moreover, our results show that developers do not always use the Delphi method to reach a consensus and are often silent about their dissemination and implementation plans, which are similar to previous studies [31−33]. In this case, poor reporting may not

Box 1 Examples of requirements for detailed descriptions of surgical technique in the included reporting guidelines.

Adequate but without a clear structure

- In the case of isolated stent graft implantation, basic details—such as the access site and entry method (cut down vs. percutaneous, surgical conduits for stent graft delivery and predilatation of access vessels), procedural time, fluoroscopy time, contrast volume, results of intraoperative angiography including endoleaks, stent graft apposition, length of the functional proximal and distal landing zone, degree of oversizing, conversion to open surgery, and any other intraoperative complications—should be given [22].

Inadequate or unclear

- Clear and detailed description of the new/planned technique/device, including necessary preprocedure and postprocedure care [23].
- Clear presentation of the surgical intervention and dosing regimen with a flow diagram outlining the pertinent study procedures [24].
- Regardless of the treatment modality being reported, sufficiently clear technical details should be given to allow other investigators to replicate the study. Each treatment modality should be clearly described in the sequence utilized. The number of times the process is repeated and alterations in the sequence should be presented [25].

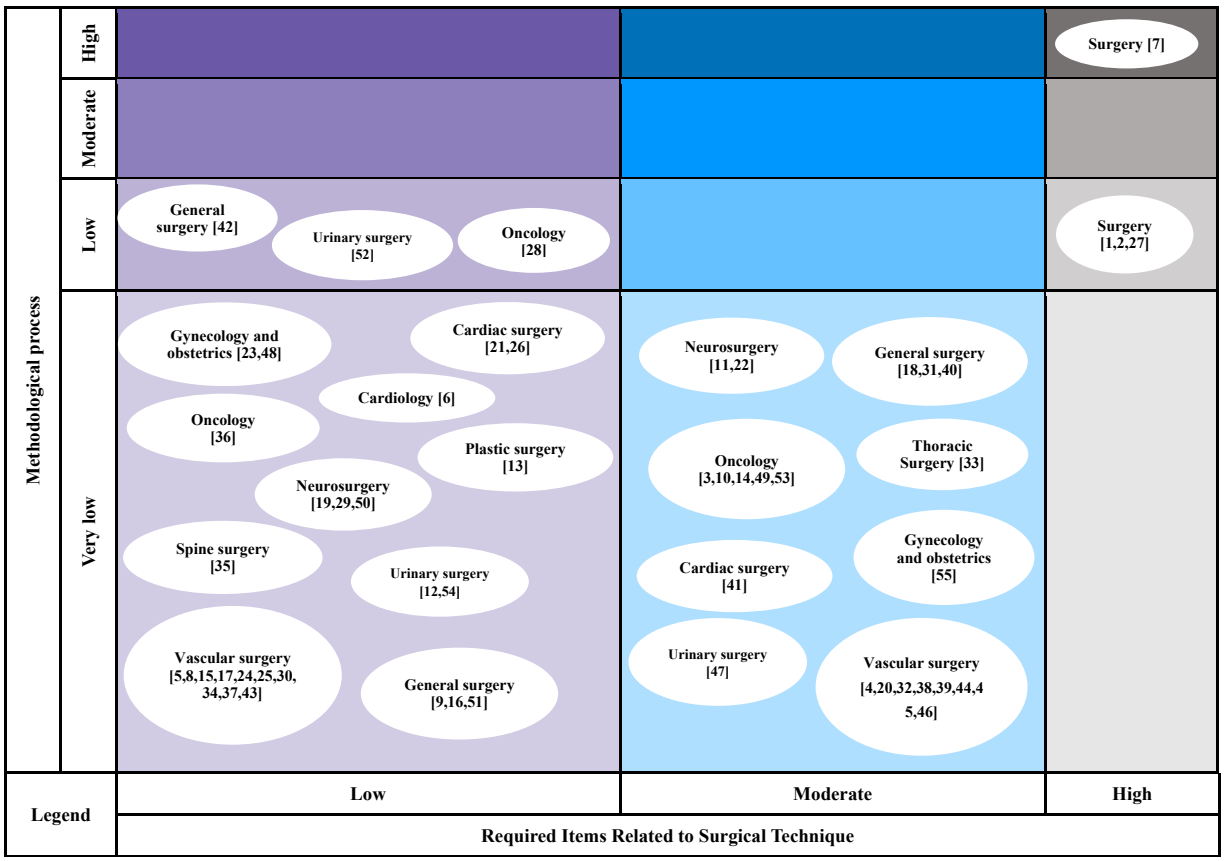

Fig. 5. Mapping of existing reporting guidelines for surgical technique. This map contains 55 reporting guidelines. Each cell shows the number of reporting guidelines in the corresponding specialty. The results showed that the vast majority guidelines scored very low for methodology and low for technique-related items. *For the reference please refer to the Supplementary Table S3; For methodological process, guidelines were scored as very low (1−5 of the 17 items), low (6−10 of the 17 items), moderate (11−15 of the 17 items), and high (16−17 of the 17 items). For required items related to surgical technique, guidelines were scored as low (including 1−3 aspects), moderate (including 4−6 aspects), and high (including 7−9 aspects).

only reflect poor methodology in conduct but a lack of transparency in development processes, which is also an important barrier in the reporting of guideline implementation [34]. Although there is an undeniable trend that guidelines published after 2014—such as the Strengthening the reporting of observational studies in epidemiology (STROCSS) guideline [35], the Preferred Reporting Of CasE Series in Surgery statement [36], and the IDEAL recommendations [23]—have endorsed a more explicit methodology, finding a relevant guideline for a study can be like trying to find a needle in a haystack.

Second, the level of detailed description that the included reporting guidelines require to make the surgical technique more reproducible is low. Although generic guidelines for reporting CONSORT- nonpharmacologic treatments [37] and intervention (template for intervention description and replication) [38] are currently available, they do not consider the specificity and all components of surgical technique. The same concern remains for guidelines we identified to assist with surgical technique reports. For example, "describe the rationale behind the treatment offered, how it was performed and time to intervention" in Surgical CAse REport [20], which has been cited over 4,000 times, and has probably been the most influential surgical technique reporting guideline published thus far. Such advice however is not sufficient due to a lack of awareness as to what comprises a good description, in particular, regarding the aspects that might introduce bias into the research and complex techniques. Furthermore surgical technique is not a fixed reality. Alongside the importance of acquiring surgical technical skills, factors like communication in the surgical team and quality assurance are essential for complete management of adverse or unexpected events that can occur during surgery [39]. However very little attention has been paid to the reporting of factors that can contribute to such variations. On the other hand innovation is an essential ingredient for the advancement of science and betterment of the human condition. Bismuth analyzed one issue of *Annals of Surgery*, and found that among the 40 published articles, there were no studies on new surgical techniques or on new treatments of surgical disease [40]. It is not coincidental that among all the reporting guidelines included in this review, future improvements of surgical technique had drawn the lowest attention. Innovation in surgical technique has been largely ignored.

Many surgeons would argue that variation in surgical skill and outcomes may never be eliminated, and that treatment depends on the individual involved. However a reporting guideline is document designed for reporting research, not clinical procedural notes on individual patients. Since Altman's 1994 article [41], there have been great initiatives to improve research quality, but progress has been modest. One recurring question is who should be responsible for research reporting. The answer is that we should all work together, but its implementation in practice encounters many challenges. For example as a researcher, finding and following an appropriate reporting guideline is one of the steps in submitting a draft. However we cannot deny that having another guideline to abide by and a checklist to fill can seem like one too many hurdles to overcome [42]. Previous research illuminated that guidelines took 20 months to complete and 11 months to publish, with a lack of sufficient funding and time constraints identified as the most pressing issues [9]. In relation to this the director of the United Kingdom EQUATOR Centre, Gary Collins, said, ''international collaboration has the potential to avoid resource waste and give different people's perspectives on the writing of reporting guidelines items, which will be more easily adopted by authors and implemented by journals''.

4.3. Strengths and limitations

This scoping review has several strengths. First our study has systematically described the situation regarding surgical technique reporting guidelines and identified areas for improvement. Second our study strictly adhered to the Joanna Briggs Institute methodological guidance [18] and PRISMA-ScR checklist [19], which ensures the methodological rigour. Third our study was discussed by members from multiple disciplines, including surgeons, methodologists, and journal editors, to maximize the details and representativeness of the extracted data.

However our study also has some limitations. For example we only included English reporting guidelines which might have resulted in publication bias and limited applicability of our findings to reporting guidelines in other languages. Also, data from the reporting guidelines were extracted verbatim, and it was assumed that if information was not documented, it did not happen, which may have led to underestimation of the true situation. Finally due to a lack of existing tools, we did not assess the quality of the included reporting guidelines.

5. Conclusion

We all benefit from high-quality research reports. However reporting guidelines that have not been developed appropriately may be of little use to authors and editors. Since CONSORT's publication in 1996 [43] the publication of reporting guidelines has grown from a trickle to a flood. However they are never simple documents to produce [44,45]. For surgical technique a standardized reporting guideline that is developed rigorously and focuses on its intraoperative implementation should be an urgent research priority for the future.

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Supplementary data

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