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Trends in Research on Patients With COVID-19 in Korean Medical Journals

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Objectives: This study was conducted to systematically summarize trends in research concerning patients with coronavirus disease 2019 (COVID-19) as reported in Korean medical journals.

Methods: We performed a literature search of KoreaMed from January 2020 to September 2022. We included only primary studies of patients with COVID-19. Two reviewers screened titles and abstracts, then performed full-text screening, both independently and in duplicate. We first identified the 5 journals with the greatest numbers of eligible publications, then extracted data pertaining to the general characteristics, study population attributes, and research features of papers published in these journals.

Results: Our analysis encompassed 142 primary studies. Of these, approximately 41.0% reported a funding source, while 3.5% disclosed a conflict of interest. In 2020, 42.9% of studies included fewer than 10 participants; however, by 2022, the proportion of studies with over 200 participants had increased to 40.6%. The most common design was the cohort study (48.6%), followed by case reports/series (35.2%). Only 3 randomized controlled trials were identified. Studies most frequently focused on prognosis (58.5%), followed by therapy/intervention (20.4%). Regarding the type of intervention/exposure, therapeutic clinical interventions comprised 26.1%, while studies of morbidity accounted for 13.4%. As for the outcomes measured, 50.7% of studies assessed symptoms/clinical status/improvement, and 14.1% evaluated mortality.

Conclusions: Employing a systematic approach, we examined the characteristics of research involving patients with COVID-19 that was published in Korean medical journals from 2020 onward. Subsequent research should assess not only publication trends over a longer timeframe but also the quality of evidence provided.

Key words: COVID-19, Journal article, Research, Republic of Korea

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is a novel respiratory infectious disease that first emerged in Wuhan, China, in December 2019. As of December 2022, Korea had reported over 27.9 million cumulative confirmed cases and 31 000 cumulative deaths [1]. Globally, the cumulative number of confirmed cases reached 646 million by December 2022, with the death toll rising to 6.6 million [2].

The swift worldwide spread of COVID-19 necessitates the rapid identification and dissemination of new information, including the characteristics of the new pathogen, its clinical manifestations, and its impacts on the healthcare system. Many countries and regions have documented the incidence and mortality rates associated with COVID-19, the appearance of variant strains, and the progress of vaccination efforts [3-5].

A systematic review examining the mortality risk associated with COVID-19 identified several risk factors for death, includ-

ing advanced age, male sex, hypertension, cardiovascular disease, diabetes, chronic obstructive pulmonary disease, and cancer [6]. The living systematic review and guidelines for COVID-19 treatment have been regularly updated to incorporate new evidence [7,8]. Due to the prolonged nature of the COVID-19 pandemic, research into the prognosis and quality of life related to the disease and its treatments has become increasingly important [9-11].

The novel nature of COVID-19, the absence of established therapies, and the uncertain progression of the disease have necessitated the swift publication of research findings, their immediate delivery to relevant parties, and the rapid dissemination of these findings. Consequently, prior research has examined the status and trends of the published literature pertaining to COVID-19.

In 2020, a total of 7457 papers were published across 31 emergency medicine journals indexed in the Scopus database. Of these, 765 papers related to COVID-19 appeared in 27 journals, representing approximately 10.0% of the total publications. The first paper on COVID-19 was published in March 2020; since then, increasing numbers of research articles and letters have been published. During this time, research articles and review papers received more citations than letters [12]. Among COVID-19–related orthopedic publications in PubMed in 2020, review articles were the predominant article type [13].

Systematic reviews on COVID-19 encompass a range of topics, including diagnosis, treatment, and prognosis. However, the quality of methodology and reporting in these reviews has been suboptimal and warrants improvement [14,15].

Understanding and combating infectious diseases through medical research is fundamental and necessary within the field of medicine. Insights into research trends can reveal progress and accomplishments, encompassing key research areas, topics, and authors. Consequently, numerous studies have been undertaken to examine the publication patterns and bibliometric analyses of COVID-19 research across various academic disciplines and countries [12,16-18]. Despite the global surge in studies prompted by the COVID-19 pandemic, a comprehensive synthesis of research involving Korean patients with the disease remains absent. Therefore, this study was conducted to characterize the current body of research on patients with COVID-19, focusing on studies published in medical journals from Korea that are indexed in KoreaMed and employing a systematic approach.

METHODS

Search Strategy

We performed a search using KoreaMed, a database that grants access to articles from medical journals, operated by the Korean Association of Medical Journal Editors (KAMJE). The search incorporated both MeSH (Medical Subject Headings) terms and text words. As of July 2023, KoreaMed includes over 336 000 articles published in 279 journals affiliated with the KAMJE. This search was carried out on September 5, 2022. The search strategy employed the following terms: ((("coronavirus" [ALL]) OR ("coronovirus"[ALL]) OR ("coronavirinae"[ALL]) OR ("2019-nCoV"[ALL]) OR ("2019nCoV"[ALL]) OR ("2019-CoV"[ALL]) OR ("nCoV2019"[ALL]) OR ("nCoV-2019"[ALL]) OR ("COVID-19" [ALL]) OR ("COVID19"[ALL]) OR ("CORVID-19"[ALL]) OR ("CORVID19" [ALL]) OR ("WNCoV"[ALL]) OR ("WNCoV"[ALL]) OR ("HCoV-19" [ALL]) OR ("HCoV19"[ALL]) OR ("CoV"[ALL]) OR ("2019 novel" [ALL]) OR ("Ncov"[ALL]) OR ("n-cov"[ALL]) OR ("SARS-CoV-2"[ALL]) OR ("SARSCoV-2"[ALL]) OR ("SARSCoV2"[ALL]) OR ("SARS-CoV2" [ALL]) OR ("SARSCov19"[ALL]) OR ("SARS-Cov19"[ALL]) OR ("SARSCov-19"[ALL]) OR ("SARS-Cov-19"[ALL])) AND (2020:2022 [DPY]).

Inclusion and Exclusion Criteria

We incorporated studies that exclusively enrolled patients with either suspected or confirmed COVID-19 at baseline, without regard to the presence of comorbidities such as diabetes, hypertension, or cardiovascular disease. Our consideration extended to all forms of primary research published, encompassing case reports, case series, cross-sectional studies, case-control studies, cohort studies, and randomized controlled trials (RCTs), published from January 2020 through September 2022.

We excluded reviews, meta-analyses, animal studies, protocols, editorials, and commentaries that did not contain primary data.

Additionally, we utilized Covidence (https://www.covidence. org/) to screen the titles and abstracts, review full texts, and perform data abstraction.

Study Selection

Pairs of reviewers, independently and in duplicate, screened the titles and abstracts of each study to assess their eligibility. For those studies deemed potentially eligible, we acquired the full texts and performed independent and duplicate full-text

screenings. Any disagreements were resolved through discussion among the reviewers or, if necessary, by consulting a third reviewer. Prior to selection, all reviewers engaged in calibration exercises at each stage to promote consistency and reliability in their assessments.

We did not restrict our selection of journals to the title, abstract, and full-text screening phases. Instead, we identified the top 5 journals for data extraction based on the number of studies deemed eligible during the full-text screening process, considering those journals with a prominent ranking for publishing COVID-19–related research as being leading or influential in the field.

Data Extraction

Data extraction was performed after calibration exercises utilizing a pre-piloted form. Teams of 2 reviewers, both independently and in duplicate, extracted the following data for each study:

(1) General characteristics of the study: name of first author, number of authors, publication year, journal name, language of main text (Korean or English), presence of international collaborative authorship (Korea only, other countries only, or both), number of participating institutions, funding source (not reported, none declared, or yes), and presence of any conflicts of interest (not reported, none declared, or yes)

(2) Characteristics of the study population: number of participants at baseline, mean age, proportion of female participants, country of patients (Korea only, another country only, or both), and COVID-19–related characteristics

(3) Characteristics of the study question: study design (case report/case series, cross-sectional, case-control, cohort, RCT, etc.), study question (therapy/intervention, prognosis, prevalence, or other), primary exposure, and primary outcome

Discrepancies in the data extraction process were addressed through discussion between the 2 reviewers or, if necessary, by consulting a third reviewer.

Statistical Analysis

Descriptive analysis was conducted to determine the characteristics of the included studies. The general and clinical attributes of these studies were presented based on the year of publication.

Ethics Statement

Ethics approval was not required because we only used data from published papers.

RESULTS

General Characteristics of Included Studies

We identified 2011 unique studies through KoreaMed, 319 of which met the eligibility criteria after full-text screening. Of these, we selected 142 studies for inclusion, which were pub-

Table 1. General characteristics of the included studies by publication year

Characteristics	Total	2020	2021	2022[1]
Total	142 (100)	63 (44.4)	47 (33.1)	32 (22.5)
Journal				
J Korean Med Sci	87 (61.3)	45 (71.4)	23 (48.9)	19 (59.4)
Infect Chemother	22 (15.5)	4 (6.4)	10 (21.3)	8 (25.0)
Korean J Intern Med	12 (8.5)	6 (9.5)	5 (10.6)	1 (3.1)
Yonsei Med J	11 (7.8)	3 (4.8)	4 (8.5)	4 (12.5)
Epidemiol Health	10 (7.0)	5 (7.9)	5 (10.6)	0 (0.0)
No. of authors				
1-5	46 (32.4)	15 (23.8)	14 (29.8)	17 (53.1)
6-10	55 (38.7)	30 (47.6)	19 (40.4)	6 (18.8)
≥11	41 (28.9)	18 (28.6)	14 (29.8)	9 (28.1)
International collaborative authorship				
Korea only	125 (88.0)	59 (93.7)	36 (76.6)	30 (93.8)
Other countries only	12 (8.5)	2 (3.2)	8 (17.0)	2 (6.3)
Korea and other countries	5 (3.5)	2 (3.2)	3 (6.4)	0 (0.0)
No. of institutions				
1	18 (12.7)	4 (6.4)	8 (17.0)	6 (18.8)
2-3	50 (35.2)	20 (31.8)	19 (40.4)	11 (34.4)
4-5	38 (26.8)	22 (34.9)	7 (14.9)	9 (28.1)
≥6	36 (25.4)	17 (27.0)	13 (27.7)	6 (18.8)
Language of publication				
English	142 (100)	63 (100)	47 (100)	32 (100)
Funding source				
Not reported	71 (50.0)	31 (49.2)	22 (46.8)	18 (56.3)
None declared	13 (9.2)	2 (3.2)	5 (10.6)	6 (18.8)
Yes	58 (40.9)	30 (47.6)	20 (42.6)	8 (25.0)
Conflicts of interest				
None declared	137 (96.5)	61 (96.8)	46 (97.9)	30 (93.8)
Yes	5 (3.5)	2 (3.2)	1 (2.1)	2 (6.3)

Values are presented as number (%).
J Korean Med Sci, *Journal of Korean Medical Science*; Infect Chemother, *Infection & Chemotherapy*; Korean J Intern Med, *Korean Journal of Internal Medicine*; Yonsei Med J, *Yonsei Medical Journal*; Epidemiol Health, *Epidemiology and Health*.
[1]Including up to September 2022.

lished across 5 journals: *Epidemiology and Health, Infection & Chemotherapy, Journal of Korean Medical Science, Korean Journal of Internal Medicine*, and *Yonsei Medical Journal*. The process of study selection is detailed in Supplemental Material 1, while Supplemental Material 2 provides a list of the studies included.

Among these journals, the *Journal of Korean Medical Science* accounted for the greatest share of publications, with 61.3% of the articles published between 2020 and 2022. Korean researchers authored the bulk of these studies, while 5 were international collaborations, representing 3.5% of the total. All studies were published in English. A funding source was declared in 40.9% of the studies, and a conflict of interest was reported in 3.5% (Table 1).

Clinical Characteristics of Included Studies

The number of studies with 10 or fewer participants declined over the years, while the share of studies enrolling 200 or more patients displayed an annual increase. Approximately 85% of the studies exclusively included Korean patients, while 78.9% involved the confirmation of COVID-19 using reverse transcription polymerase chain reaction. Cohort studies ac-

Table 2. Clinical characteristics of included studies by publication year

Variables	Total	2020	2021	2022[1]
Total	142 (100)	63 (44.4)	47 (33.1)	32 (22.5)
Total no. of participants				
1-10	44 (31.0)	27 (42.9)	8 (17.0)	9 (28.1)
11-50	21 (14.8)	7 (11.1)	9 (19.2)	5 (15.6)
51-100	15 (10.6)	7 (11.1)	6 (12.8)	2 (6.3)
101-200	18 (12.7)	8 (12.7)	7 (14.9)	3 (9.4)
≥201	44 (31.0)	14 (22.2)	17 (36.2)	13 (40.6)
Country of patients				
Both	5 (3.5)	4 (6.4)	0 (0.0)	1 (3.1)
Korea only	120 (84.5)	53 (84.1)	38 (80.9)	29 (90.6)
Not reported	2 (1.4)	1 (1.6)	1 (2.1)	0 (0.0)
Other country only	15 (10.6)	5 (7.9)	8 (17.0)	2 (6.3)
Confirmation method of COVID-19				
Not reported	30 (21.1)	15 (23.8)	7 (14.9)	8 (25.0)
RT-PCR	112 (78.9)	48 (76.2)	40 (85.1)	24 (75.0)
COVID-19 vaccination history				
Not reported	125 (88.0)	58 (92.1)	44 (93.6)	23 (71.9)
All unvaccinated	8 (5.6)	5 (7.9)	1 (2.1)	2 (6.3)
Some or all vaccinated	9 (6.3)	0 (0.0)	2 (4.3)	7 (21.9)

(*Continued to the next*)

Table 2. Continued

Variables	Total	2020	2021	2022[1]
Patient status				
Not reported	21 (14.8)	10 (15.9)	8 (17.0)	3 (9.4)
Only outpatient	8 (5.6)	5 (7.9)	2 (4.3)	1 (3.1)
Only inpatient	105 (73.9)	47 (74.6)	32 (68.1)	26 (81.3)
Both	8 (5.6)	1 (1.6)	5 (10.6)	2 (6.3)
Intensive care at baseline				
Not reported	78 (54.9)	37 (58.7)	25 (53.2)	16 (50.0)
None	23 (16.2)	11 (17.5)	7 (14.9)	5 (15.6)
Some	29 (20.4)	12 (19.1)	12 (25.5)	5 (15.6)
All	12 (8.5)	3 (4.8)	3 (6.4)	6 (18.8)
Type of study design				
Randomized controlled trial	3 (2.1)	0 (0.0)	2 (4.3)	1 (3.1)
Cohort study	69 (48.6)	25 (39.7)	30 (63.8)	14 (43.8)
Case-control study	6 (4.2)	1 (1.6)	1 (2.1)	4 (12.5)
Cross-sectional study	8 (5.6)	6 (9.5)	2 (4.3)	0 (0.0)
Case report/series	50 (35.2)	30 (47.6)	10 (21.3)	10 (31.3)
Others	6 (4.2)	1 (1.6)	2 (4.3)	3 (9.4)
Study question				
Therapy/intervention	29 (20.4)	11 (17.5)	9 (19.2)	9 (28.1)
Prognosis	83 (58.5)	34 (54.0)	31 (66.0)	18 (56.3)
Prevalence	18 (12.7)	9 (14.3)	5 (10.6)	4 (12.5)
Other	12 (8.5)	9 (14.3)	2 (4.3)	1 (3.1)
Type of intervention/exposure				
Therapeutic clinical intervention (e.g., drug therapy)	37 (26.1)	15 (23.8)	10 (21.3)	12 (37.5)
Morbidity (e.g., cardiovascular disease, cancer)	19 (13.4)	9 (14.3)	6 (12.8)	4 (12.5)
Multiple exposures (e.g., prognostic factors)	18 (12.7)	8 (12.7)	6 (12.8)	4 (12.5)
Biophysical status (e.g., blood pressure, blood lipids)	10 (7.0)	4 (6.4)	5 (10.6)	1 (3.1)
Others	58 (40.9)	27 (42.9)	20 (42.6)	11 (34.4)
Type of outcome				
Symptom/clinical status/ improvement (NEWS2, fever)	72 (50.7)	36 (57.1)	19 (40.4)	17 (53.1)
Mortality (e.g., all-cause or disease-specific mortality)	20 (14.1)	6 (9.5)	10 (21.3)	4 (12.5)
Viral clearance	7 (4.9)	3 (4.8)	4 (8.5)	0 (0.0)
Admission to hospital/length of hospital stay	5 (3.5)	0 (0.0)	4 (8.5)	1 (3.1)
Biophysical status (e.g., blood pressure, blood lipids)	5 (3.5)	2 (3.2)	2 (4.3)	1 (3.1)
Others	33 (23.2)	16 (25.4)	8 (17.0)	9 (28.1)

Values are presented as number (%).
COVID-19, coronavirus disease 2019; RT-PCR, reverse transcription polymerase chain reaction; NEWS2, National Early Warning Score 2.
[1]Including up to September 2022.

counted for 48.6% of the articles, with a mere 3 studies (2.1%) being RCTs. Research questions were related to prognosis in 58.5% of the studies, while those concerning therapy or intervention constituted 20.4%. Regarding the type of intervention or exposure, therapeutic clinical interventions were the focus of 26.1% of the studies, and morbidity was examined in 13.4%. In terms of outcomes, more than half of the studies (50.7%) assessed symptoms, clinical status, or improvement, and 14.1% evaluated mortality (Table 2).

DISCUSSION

Main Findings

This study employed a systematic approach to examine the characteristics of research conducted among patients with COVID-19, as reported in Korean medical journals from 2020 onward. Of 142 studies, 5 involved collaborations with international researchers, and approximately 50% made any declaration regarding funding. By 2022, an increase was evident in the number of studies that included a large patient cohort relative to the year 2020. Roughly 20.0% of the studies assessed the effects of interventions, such as pharmaceutical treatments, but only 3 of these were RCTs. The most frequently observed study outcome was improvement in clinical symptoms, accounting for 50.7%, with mortality outcomes being the next most common at 14.1%.

Strengths and Limitations

This study possesses multiple strengths. Calibration exercises were conducted at every stage to enhance the consistency and reliability of the reviewers. Furthermore, the processes of study selection and data extraction adhered to international standards, including the independent and duplicate selection of articles and the extraction of data. The results provide a comprehensive presentation of the publication trends in studies concerning patients with COVID-19, as reported in Korean medical journals, utilizing the most current data available.

This study also has certain limitations. For instance, our inclusion criteria were restricted to studies published in journals indexed by KoreaMed, a medical journal database managed by the KAMJE. Not all medical journals in Korea are affiliated with this organization; however, the database does encompass all key and influential journals produced by major medical societies within the country. That said, we acknowledge that sourcing data from a single database does not capture the full spectrum of research. Studies by Korean authors or involving Korean patients with COVID-19 that are published in journals indexed by other databases may exhibit different trends from those observed in our study. Consequently, the data on COVID-19 publications presented here reflect only a single facet of the research activities in Korea. To obtain a more comprehensive view of research trends, future studies should consider including core databases such as the Cochrane Library, Medline, and Embase.

Another major limitation of our study is the method by which we selected the top journals, which was based on the volume of COVID-19–related papers published, to discern research trends. While Korea has a multitude of medical journals, our selection was narrowed to only 5 that published a substantial number of studies pertaining to COVID-19. We presumed that journals with a high frequency of COVID-19–related publications were leading or influential within the research community. Previous research has indicated that Korean publications have made considerable contributions to the global body of literature largely through specific journals, such as the *Journal of Korean Medical Science* [19]. Nonetheless, it is possible that certain impactful studies relevant to COVID-19 may have been overlooked in our selection because they were not published within these 5 selected journals.

The literature search, conducted in September 2022, encompassed studies published over approximately 2.5 years since the first reported case of COVID-19 in Korea in January 2020. Consequently, RCTs and cohort studies, specifically those necessitating large patient populations or extended follow-up durations, were largely excluded. Further research is warranted to discern research trends over longer periods. Additionally, while some journals released a special issue on COVID-19 at the close of 2022, these articles were not incorporated into our review.

Relation to Previous Work

In this study, international collaborative authorship was responsible for 5 studies, which represents 3.5% of the total. Previous research has shown that studies involving international collaboration tend to be published in more influential journals compared to those without such collaboration [20]. Furthermore, international collaboration has been found to increase the impact of research articles [21]. These collaborations are crucial in elevating the quality of research outcomes, particularly with respect to the completeness and scientific

impact of the dissertations. However, it is possible that international collaborative research was underrepresented in this study because such work is often submitted to international journals.

While only approximately 50% of the selected studies made a declaration regarding funding sources, all articles contained a statement regarding conflicts of interest. Industry-sponsored research has been shown to more frequently yield favorable results regarding drug efficacy compared to alternatively funded studies [22]. Consequently, reporting guidelines for studies, such as the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) and the CONSORT (Consolidated Standards of Reporting Trials) guidelines, recommend that the disclosure of funding sources be mandated [23,24]. The presence of a conflict of interest does not necessarily indicate scientific misconduct; however, it can be a contributing risk factor, underscoring the need for its transparent disclosure. Research has indicated that the declaration of conflicts of interest is more consistently enforced than the disclosure of funding sources. In an analysis of 650 COVID-19–related articles across 59 dental journals, 74.0% included statements on conflicts of interest, while 40.0% provided information on funding [18]. The lack of transparency in research, such as undisclosed funding sources, could stem from the authors' lack of awareness or reflect the editorial policies of the journals, which may only require such disclosures when funding is received.

In 2020, approximately 43.0% of the studies involved 10 or fewer patients, whereas by 2022, an increase was noted in the number of studies including over 200 patients. Regarding the research questions posed, prognosis emerged as the most common focus, accounting for 58.5% of studies, followed by therapy/intervention (20.4%). Studies examining treatment effects saw an uptick in 2022 compared to 2020. An investigation into COVID-19 research in early 2020 revealed that case reports and case series were the most rapidly growing types of studies published in PubMed, while RCTs were comparatively scarce [16]. Case reports/series and smaller observational studies could swiftly communicate clinical observations and the progression of patients with COVID-19, while generating hypotheses for further interventions or analytical research. In comparison, RCTs and cohort studies are better positioned to deliver robust evidence regarding the efficacy of interventions or treatments [25]. However, such studies often require a substantial number of participants and extended follow-up periods to yield high-quality evidence, resulting in a longer time

to publication. The current study examined publications spanning less than 3 years and did not include data on patient recruitment or follow-up durations. Consequently, future research should explore publication trends over a more extended period.

Implications for Future Research

Employing a systematic approach, we explored the characteristics of research involving patients with COVID-19 that was published in Korean journals from 2020 onward. We summarized the focal points of these studies, including their overall features, research design, and measured outcomes. Our findings could inform the planning of future research endeavors in terms of both design and subject matter.

In the initial phases of emerging infectious diseases, case reports and retrospective studies can offer vital insights into the clinical features and progression of these conditions, as demonstrated by our findings. Furthermore, analyses of research trends can furnish a comprehensive and long-term perspective, encompassing not only current studies but also those planned or anticipated in the future, by incorporating data from studies registered in protocol/trial registries.

If the study had encompassed both individuals with COVID-19 and the public, it would have been possible to examine the risk of infection, vaccine efficacy, and adherence to quarantine protocols. By broadening the scope of the study population to include a more diverse group in future research, a more complete body of evidence can be gathered to inform trends in the context of COVID-19.

Of the 142 studies analyzed, 5 were conducted in collaboration with international researchers, and approximately half included a declaration regarding research funding. In comparison to 2020, the year 2022 saw an uptick in the number of studies that included large patient cohorts. Roughly 20% of the studies assessed the impact of interventions, such as pharmaceutical treatments; however, only 3 of these were RCTs. Given that this analysis focused on studies concerning patients with COVID-19 in Korea over a span of approximately 2 years—up to September 2022—a need exists for future research to examine publication trends over more prolonged periods.

NOTES

Supplemental Materials

Supplemental materials are available at https://doi.org/10.3961/jpmph.23.254.

Author Contributions

Conceptualization: Choi H, Song S, Ahn H, Yang H, Lim H, Park Y, Kim J, Yong H, Yoon M, Han MA. Data curation: Choi H, Song S, Ahn H, Yang H, Lim H, Park Y, Kim J, Yong H, Yoon M, Han MA. Formal analysis: Han MA. Funding acquisition: None. Methodology: Han MA. Project administration: Choi H, Song S, Ahn H, Yang H, Lim H, Park Y, Kim J, Yong H, Yoon M, Han MA. Visualization: Han MA. Writing – original draft: Choi H, Song S, Ahn H, Yang H, Lim H, Park Y, Kim J, Yong H, Yoon M, Han MA. Writing – review & editing: Choi H, Song S, Ahn H, Yang H, Lim H, Park Y, Kim J, Yong H, Yoon M, Han MA.

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