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ESICM consensus-based recommendations for the management of very old patients in intensive care

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Competing Interests

CR received fees as speaker from Edwards, BD and Integra.

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Abstract

Purpose

~~Very old patients (age ≥80 years) represent the fastest growing cohort in intensive care units in many countries.~~ The heterogeneity of very old patients (age ≥80 years) ~~within this cohort~~ and the prevalence of complex geriatric syndromes in this cohort constitute major challenges for the classical methods of evidence-based medicine to inform clinical practice. There still is no robust guidance for the management of critical conditions in these patients leading to considerable uncertainty among practitioners and unwarranted variations of care. ~~On this background, Members of~~ The European Society of Intensive Care Medicine (ESICM) initiated a Delphi study to translate the empirical knowledge of experts in this field into consensus-based recommendations for clinical practice.

Methods

A multi-national group of specialists in intensive care, emergency and geriatric medicine provided opinions on managing very old patients with critical conditions. Strong or moderate consensus was defined as having at least 90% or 80% of experts, respectively, expressing agreement or disagreement on the three highest or lowest levels of a 9-points Likert scale.

Results

Twenty-eight members of the steering group and 82 additional experts completed two rounds of the Delphi study. After discussing the results, the steering group issued recommendations for 48 statements and 2 checklists for which consensus was achieved. In addition to outlining fundamental principles, they include advice on goals of care and the decision-making about admission to and management of patients in intensive care. ~~Seventeen survey items did not pass the threshold of consensus.~~

Conclusion

A multi-disciplinary group of experts achieved consensus on recommendations concerning intensive care for very old patients, which were approved and endorsed by ESICM. The implementation requires a careful analysis of healthcare resources and should proceed in a stepwise and adaptive fashion.

Key words

Critical care, Delphi study, Emergency medicine, Geriatric medicine, Intensive care

Take-home message

A multi-disciplinary group of experts achieved consensus on recommendations concerning intensive care for very old patients. The implementation requires a careful analysis of healthcare resources and should proceed in a stepwise and adaptive fashion.

Introduction

Very old patients, defined as patients aged 80 years or older in this article, represent the fastest growing cohort in intensive care units (ICUs) in many countries [1]. By contrast to younger individuals, this cohort is characterised by a high prevalence of functional impairments and multiple co-morbidities with the prevalence of complex multi-morbidity peaking in octogenarians [2,3]. The ageing-related accumulation of these conditions coincides with an increased vulnerability to stress (frailty), which is considered a substitute for biological age and influences ICU survival, recovery of functional abilities and quality of life after discharge [4-6]. Furthermore, an increase of the biological and functional heterogeneity between individuals is considered a hallmark of ageing [7-10] with the physical performance and vital signs being most variable at very old age [8,11-13]. Importantly, this heterogeneity goes along with a considerable divergence of attitudes towards the value of functional independence and quality of life after ICU, which further complicates decision-making about intensive care in these individuals [9,14,15].

The prevalence and variability of geriatric conditions in very old patients, notably multi-morbidity and frailty, constitute a major challenge to the classical armamentarium of evidence-based medicine to inform decisions about the optimal management of critical conditions [9,10,16,17]. Most tools in this field were designed to investigate a small number of interventions for single conditions in largely homogeneous populations, which led to the exclusion or inadequate representation of very old patients in many clinical trials [18-21]. Consequently, there is a scarcity of evidence for the management of critical disorders in this age group and the optimal model of intensive care for these patients remains unknown [22]. These issues have already been acknowledged in recommendations for the emergency care of geriatric patients in Europe, practice guidelines for the perioperative care of older adults with frailty in the UK and a consensus paper on geriatric intensive care in Germany [23-26]. On a background of a broad spectrum of professional norms, different social attitudes and the diversity of healthcare resources, the lack of robust guidance on how to deal with the specific characteristics of very old patients in the ICU [17,22] has resulted in considerable uncertainty and variations among practitioners with wide-ranging ethical implications [27-30].

To address these issues, this project aimed to develop guiding principles and recommendations for healthcare professionals involved in the management of very old individuals with critical conditions. In the absence of high-quality evidence in this field, seeking consensus within a multi-disciplinary group of experts constituted the best option to translate existing knowledge into recommendations for clinical practice.

Methods

This project was initiated by the Health Services Research & Outcome (HSRO) section of the European Society of Intensive Care Medicine (ESICM) and endorsed by its research committee in 2023. After inviting all sections and groups within ESICM, a multi-disciplinary steering group was formed by 21 delegates nominated by all interested sections and groups ~~within ESICM~~ including the methodology group (see list of authors) [31]. This group decided to invite nine additional experts from emergency and geriatric medicine in Europe as well as two intensivists from Asia and North America considering their expertise. Meetings were held on Zoom (www.zoom.us) to facilitate participation of all members of the steering group as well as during the ESICM LIVES meeting in Milan in October 2023.

A literature search focused on clinical trials on any intervention in intensive care or critical care in very old or very elderly patients or the oldest old, including octogenarians and nonagenarians, was performed on PubMed (Pubmed.ncbi.nlm.nih.gov) in August 2023 using the query `<("intensive care" OR "critical care") AND patient* AND (geriatric* OR "very old" OR "very elderly" OR "oldest old" OR octogenarian* OR nonagenarian*)>` without limitation on the date of publication. This search did not identify any trial which addressed the distinct needs of very old patients in intensive care. The steering group discussed this finding and ~~therefore~~ decided to use the Delphi method to explore the empirical knowledge of experts and issue consensus-based recommendations.

Based on the recommendations by the Enhancing the QUAlity and Transparency Of health Research (EQUATOR) network [32], the steering group developed a protocol for a multi-round Delphi study [33] and drafted a list of statements and handover checklists arranged along the trajectory of very old patients with critical conditions as well as a list of priorities for future research. The steering group obtained advice from patient representatives on the selection and wording of these items. These representatives were identified through advocacy groups in England and The Netherlands and clinical ethics committees in France.

The steering group chose the 9-points Likert scale as the instrument to measure the agreement or disagreement of individual participants in the Delphi study (panellists) with each survey item. The scale ranged from "I strongly disagree" (level 1) to "I strongly agree" (level 9) and provided the additional option to score "I don't know" if panellists felt unfamiliar with a particular topic. The extent of agreement or disagreement between panellists for each survey items was quantified after each Delphi round as the percentage of votes submitted at Likert levels 7-9 or 1-3, respectively, relative to all votes submitted at any Likert level between 1 and 9 for this item, regarding either the group of all panellists (overall agreement) or only those belonging to one of

three specialty groups (intensive care, emergency medicine, geriatric medicine) or the group "others" which was composed of panellists who did not belong to a specialty group. Consensus was defined as strong or moderate if the agreement or disagreement between panellists was ≥90% or between 80% and 90%, respectively. Survey items for which consensus was achieved after a survey round were not included in the subsequent rounds of the Delphi study. The final number of rounds in the Delphi study was determined by the steering group according to the need to modify survey items.

The study protocol and the final version of the first Delphi round (Table S1 in Supplementary Information) were agreed by the steering group. The Ethics Committee at the Medical School of the Heinrich-Heine-University in Düsseldorf, Germany, granted ethical approval for the study in December 2023 (no 2023-2680). The study protocol was then registered on https://osf.io/nzqap and the survey was implemented on the Welphi platform (www.welphi.com - Decision Eyes Corp, Lisbon, Portugal).

After separating a group of 4 members of the steering group (BM, ML, DP, MB) to monitor the Delphi process, the first survey round started with the remaining 28 members of the steering group on 27th December 2023. It continued with sending invitations by email to additional experts, who were nominated by previous participants ("snowball sampling") and confirmed by the monitoring group, until 7th February 2024. The steering group defined the following selection criteria for new panellists before starting the study: a) being a healthcare practitioner, e.g. physician or nurse, involved in the management of critically ill patients at very old age or b) participating in clinical research in this field. All panellists were required to provide informed consent and a declaration of potential conflicts of interest. They were asked to submit information about their specialty, professional role, age, gender and country where they practise medicine. Moreover, the panellists were surveyed regarding their opinions about the definition of 'very old patients' and priorities for future research in this cohort.

Before scoring statements and checklist items on the Welphi platform, panellists were informed that the survey items reflect the aspiration by the steering group to develop recommendations for the optimal management of very old patients. The word 'should' was frequently used in statements to indicate that there were factors outside the control of clinicians which may affect whether a clinician can follow a particular recommendation. The panellists had the opportunity to submit concerns about the feasibility of implementing specific recommendations in their country as a comment to each statement or checklist item. They were also invited to submit feedback about the content and wording of survey items, which was used for adjustments for the subsequent Delphi round. The first Delphi round also included an option for panellists to suggest additional items for the next round. These suggestions required confirmation by the steering

group before implementation. All inputs were recorded in an anonymised way and provided as Microsoft-Excel sheets at the end of survey rounds by the Welphi platform.

The steering group reviewed the results of the first Delphi round in February 2024 before drafting and approving the second Delphi round (Table S1 - Supplementary Information). Items for which consensus was obtained in the first round as well as items where the steering group did not expect significant changes of voting patterns were excluded. The second Delphi round started on 17th March 2024 and ran for 3 weeks. Panellists were shown the statistical results of the first round before voting in the second round. They were invited again to provide feedback about the wording of survey items. Moreover, panellists were asked to rank priorities for future research (Table S1 - Supplementary Information).

After reviewing the results of the second survey round, the steering group decided that further changes of voting patterns were unlikely and concluded the Delphi study. This decision was based on the votes below Likert level 7 for a particular statement and the feedback by panellists about its wording. The steering group then discussed and issued strong and weak recommendations for consented survey items according to Grading of Recommendations Assessment, Development, and Evaluation (GRADE) categories [34]. Strong recommendations for or against a statement or checklist item required a strong consensus, i.e. at least 90% of all panellists voted on Likert levels 7-9 or 1-3, respectively. Weak recommendations were issued for items with moderate consensus, i.e. between 80% and 90% of all panellists voted on Likert levels 7-9 or 1-3, respectively.

A sensitivity analysis was performed to assess the dependence of the degree of consensus and, hence, the strength of recommendations on the number of panellists per specialty group [35]. In this analysis, each of the three groups (intensive care, emergency and geriatric medicine) was assigned the same weight, regardless of group size, before determining an overall level of consensus by averaging the group votes, i.e. the percentages of agreement.

The steering group drafted the final report with the list of recommendations. The paper was approved and endorsed by the Executive Committee of ESICM in November 2024.

Results

Out of 224 experts invited to participate in first the round of the survey (40% female, 80.2% medical doctors), 131 submitted responses to at least the first set of statements and 124 (55.4%) completed the first round. Out of the latter group, 112 experts (90.3%) started the second Delphi

round, and 110 participants (41% female, 85.5% medical doctors) completed this round. Among the participants who completed the second round, intensive care medicine (n=70 (64%), 81.4% medical doctors) was the largest specialty group, followed by geriatric medicine (n=23 (21%), 100% medical doctors) and emergency medicine (n=9 (8%), 88.9% medical doctors). The majority of participants (60.9%) were between 40 and 60 years of age. Table S2 (Supplementary Information) shows the geographic location of these panellists. Eight panellists declared a conflict of interest which, in six cases, was related to grants for research and publications in fields related to this study. The other panellists declared industry funding which was not associated with this project.

Figure S1 (Supplementary Information) shows the distribution of the panellists' opinions about the definition of very old patients by using a cut-off for chronological age. Ninety-five percent of participants considered 80 years or above as an appropriate cut-off, 57% favoured the threshold of 80 years. This confirmed the initial definition of 'very old patients' in the study protocol.

After two Delphi rounds, consensus was achieved for 48 statements and 2 checklists. The steering group issued strong (≥90% overall agreement) or weak recommendations (between 80% and 90% overall agreement) for these items, encompassing general principles of intensive care for very old patients, recommendations for specific stations along the patients' trajectory and infrastructure and service development (Tables 1-5). Figure 1 depicts the strong recommendations which were based on ≥90% agreement in each of the three specialty groups.

Seventeen items from various topic areas did not pass the threshold of consensus (Table S3 - Supplementary Information). The lowest level of overall agreement was 46.3% indicating that 53.7% of participants voted at Likert levels 1-6 which is below the level of disagreement needed to issue a recommendation against a particular statement. Thus, there was no survey item in the Delphi study which got a negative recommendation.

As a consequence of the sensitivity analysis by equalising the size of the three major specialty groups (intensive care, geriatric and emergency medicine), recommendations for 14 survey items differed from those eventually issued without equalising, with 6 items that would have been upgraded from weak to strong recommendation and 2 items that would have lost the status of a recommendation because of less than 80% agreement in this analysis (Tables 1-5).

Discussion

We developed a set of recommendations for the management of very old patients with critical conditions and outlined priorities for future research. The Delphi method was utilised because of the scarcity of evidence for specific interventions in this cohort. Participation and retention of panellists were comparable to a recent Delphi study on time-limited trials in the ICU [36]

There was a strong overall agreement for most of the statements on general principles of intensive care for very old patients, which were aimed to support a holistic and patient-centred approach to the decision-making for this cohort (Table 1). This includes a strong recommendation to consider the patients's individual perspectives about quality of life which may include their religious beliefs. Although the patients' personal attitudes towards likely functional outcomes should be considered prior to ICU admission, some ICU survivors have the ability to adapt to and accept new impairments [new 37]. Of note, a recent study found that less than 10% of older ICU survivors would oppose another ICU admission [new 38].

~~Exceptions were~~ Although the statements on the continuity of collaborative case management (Table 1) and the involvement of geriatricians in decisions about the ceiling of life-sustaining treatment (Table S3 - Supplementary Information) did not achieve the same level of consensus as the other statements in this category, ~~However,~~ there was strong support for these two statements among geriatricians. This ~~which~~ reflects this specialty's focus on aligning goals of care with individual needs and preferences both in the short and long term which might include dying with dignity [10,17]. It seems evident that a collaborative approach may not only improve patient outcomes, but also help to prevent overtreatment in a cohort which is known to suffer from substantial disabilities and require substantial healthcare resources after intensive care [37,38]. Intensivists who are routinely confronted with terminal conditions in very old patients may benefit from confirming their prognostic assessment by a second opinion available in such a collaborative setup [39]. In case of conflict between patient's preferences and a new prognostic evaluation in the ICU, geriatricians could help to align the expectations of patients and families with the severity and likely outcome of the acute illness.

The consented statements and checklists concerning key stations along the patient trajectory, from ICU admission to post-ICU care (Tables 2-4), were designed to optimise the quality of intensive care by supporting the alignment of major decisions with the patient's medical background and attitudes towards predicted outcomes. This is of particular importance considering the substantial biological, functional, psychological and social heterogeneity among very old patients which necessitates personalised treatment plans with an emphasis on what matters to the individual [7-10,18].

There was strong consensus for all but 1 survey item regarding admission of very old patients to the ICU (Table 2). Most of these items received unanimous support by emergency physicians who routinely request ICU admissions. ~~This includes considering time-limited trials in case of substantial prognostic uncertainty [36].~~ Concerns were raised in the steering group about the checklist item 'current residence' since this information might be used in some countries to exclude residents of nursing homes from ICU admission. The low level of agreement among intensivists regarding the need of information about delirium on ICU admission might have been related to the fact that delirium is routinely assessed on arrival in the ICU and treated on this basis. The strong consensus on the management of delirium in the ICU (Table 3) emphasised the perceived importance of that condition among all panellists. Of note, the option to admit very old patients to a geriatric intermediate care (high-dependency) unit as an alternative to ICU did not gain sufficient support in this group of experts (Table S3 - Supplementary Information).

The majority of statements on the management of very old patients inside the ICU reached the level of strong consensus (Table 3). Although there was strong agreement in all specialty groups for the statements on treatment escalation planning as well as family meetings and 95% of intensivists would seek consensus within the ICU team and with other healthcare professionals before limiting life-sustaining treatment, only 60% of intensivists vs 87% of geriatricians supported the participation of geriatricians in family meetings (Table S3 - Supplementary Information). The difference in response between the groups indicates the need for a better understanding between intensivists and geriatricians on their potential roles in the context of critical care. Moreover, the low level of agreement by geriatricians regarding the role of expected functional outcome for decisions about limiting life-sustaining treatment suggests the need for intensivists to better communicate the risk and burden of intensive care to other specialties. The low level of agreement among intensivists about an additional medication review by other experts performed in the ICU (Table 3) possibly reflects the confidence that most intensivists have in their ability to review and prescribe medications in the acute setting. However, 91.4% of intensivists later agreed that a medication review should be undertaken around the time of transfer from the ICU (Table 4) which may have a more pronounced effect on the patient's trajectory in the long term.

There was strong agreement on most items concerning the transfer from the ICU (Table 4). The weak consensus among intensivists and geriatricians about transferring very old patients to geriatric units early as well as the lack of consensus on involving the geriatric team in discharge planning (Table S3 - Supplementary Information) might reflect the constraints on the resources in geriatric medicine perceived in the daily life of many panellists. The weak agreement regarding the item on skin integrity on the transfer checklist is in contrast to the strong agreement on having a guideline for pressures sores and skin problems in the ICU (Table 3). Although this result might

be due to the rare involvement of intensivists in discussing these issues, which are mainly managed by the nursing staff, this finding should trigger further reflections since this topic is of particular importance in very old patients [40].

Most statements on the management of ICU survivors in hospital and in the community received support by only 80%-87% of intensivists who are usually not involved in these domains (Table 4). Of note, three of the recommendations would be updated from weak to strong if all three specialty groups would have been of equal size (see sensitivity analysis). Statements on the follow-up of patients were not supported by a sufficient number of panellists (Table S3 - Supplementary Information), which seems to be in contrast to the strong agreement on the benefit of feedback about long-term outcomes (Table 5). This finding might be related to the wording of these statements which included a minimum length of stay in the ICU, which many panellists could have disagreed with. However, there was no detailed feedback by panellists on how to define a suitable group of patients for follow-up.

The lowest levels of agreement were found in the domains of infrastructure and service development (Table 5, ~~). Three survey items did not receive sufficient support by panellists (~~Table S3 - Supplementary Information). This situation likely reflects the substantial diversity of healthcare systems with some services, such as ethics consultations, not being easily accessible in some places. Moreover, some intensivists and emergency physicians might not yet appreciate the value of speech therapists or social workers for the care of very old patients. Geriatricians, who routinely work with multi-disciplinary teams, markedly differed in their votes. Importantly, the statement on the skills' mix in intensive care gained support by all geriatricians but only by 77.1% of intensivists. A similar gap was found with respect to multidisciplinary programmes for continuing medical education (CME). Moreover, 95.7% of geriatricians strongly supported the availability of geriatric beds for ICU step-downs, but only 82% of intensivists shared this opinion. A similar voting pattern was observed for the statement on the involvement of geriatric teams in the assessment of rehabilitation potential and functional outcome~~, which did not pass the threshold of consensus~~ (Table S3 - Supplementary Information). In this context, however, there was strong agreement among intensivists and geriatricians to extend the training curricula in intensive care and geriatric medicine by components from each other's domain, which is a pivotal step to facilitate interdisciplinary collaborations in the future [41]. Of note, a curriculum for geriatric emergency medicine has already been published in 2016 [42].

When asked about future priorities for research, most panellists favoured outcome measures other than survival, followed by investigating the challenges of decision-making about life-sustaining treatment and the management of polypharmacy in very old patients (Figure S1 - Supplementary Information). Importantly, research on the individualised management of geriatric

conditions was also ranked high, reflecting the uncertainties in this field. The topic of pathophysiology of critical conditions in very old patients, which was considered as important or very important by more than 90% of panellists, includes research into the mechanisms of frequent conditions, such as sepsis, to identify optimal management pathways for these patients.

A task force from the European Society for Emergency Medicine and the European Geriatric Medicine Society published recommendations for the emergency care of older adults based on a Delphi study [24]. A smaller consensus paper dedicated to the intensive care in old patients, issued by professional societies in Germany and Austria, included 16 statements covering a broad range of topics. Some of those were similar to topics included in our paper, such as the involvement of geriatric teams [26]. The latter topic was also emphasised in a guideline for perioperative care for people living with frailty in the UK [43] as well as in several other reviews in this field [17,44]. This made it surprising that several statements on this key topic did not pass the threshold of consensus in our study, notably concerning the participation of geriatricians in the decision-making in the ICU (Table S3). This may indicate the need to strengthen the awareness of a potentially positive relationship between intensive care and geriatric medicine similar to that between emergency physicians and geriatricians [24]. In addition to developing a holistic framework for the decision-making about life-sustaining treatment in very old individuals, this combined specialty approach could help to improve patient-centred outcomes in the long-term, such as functional independence and quality of life.

Implementation of recommendations

We expect our consensus-based recommendations to provide a benefit in the following domains: a) consideration of patients' views and preferences in the decision-making about intensive care (Tables 1 and 2), b) processes and resources to adjust intensive care to the specific needs of very old patients (Tables 2-5) and c) guidance for healthcare professionals in situations of uncertainty (Tables 2 and 3). The steering group refrained from formulating specific recommendations for interventions targeting abnormal physiology. Although some conditions which are highly prevalent in very old patients have been investigated in detail, especially delirium [45], there have not been clinical trials that examined their management on the background of the heterogeneous needs and complex comorbidities requiring multi-factorial interventions in this cohort [3,20,46].

The implementation of our recommendations into clinical practice depends on the priorities and infrastructure of a particular healthcare system. It should also be noted in this context, that the distinction between "strong" and "weak" recommendations, as defined by GRADE [34],

sometimes depended only on a small number of votes. Thus, it is important that the decision to implement a recommendation is based on careful reflection on the merits of that statement for a particular healthcare setting, and our recommendations are by no means meant to be binding for all healthcare systems. After identifying the strengths and weaknesses of a specific healthcare system, it may be reasonable to develop a step-wise plan centred on integrating the principles outlined in Table 1 [14,17].

Communication between stakeholders is a key component when reflecting on the advantages and disadvantages of intensive care for very old individuals [14]. At the management level, this includes debates on the potential for harmful consequences caused by diverting resources away from other clinical services in the presence of failure to improve patient-centred outcomes. This issue should be tightly monitored by checking both process quality and outcome measures. This requires auditing clinical notes, such as those concerning patients' preferences, the implementation of specific care processes, such as early mobilisation, and the availability of educational programmes focused on the management of very old patients. Secondly, patient-centred outcomes encompassing recovery of functional abilities and quality of life, in addition to survival, require consolidation. A number of research priorities, many incorporating these considerations, gained strong support by panellists (Figure S2 in Supplementary Information).

Strengths and limitations of this project

The Delphi study conducted according to established standards constituted the best option to explore areas of consensus among experts. Although we cannot exclude the risk of bias caused by the selection of panellists, we tried to mitigate its impact by inviting a large multi-national group of experts. We did not include healthcare professionals from countries where very old patients are not regularly admitted to intensive care which we considered essential to obtain expert opinions.

A sensitivity analysis indicated that the difference in size between the three major specialty groups had only a limited impact on the level of agreement and strength of recommendations. In-person meetings might have helped to further clarify the intent and context of some statements, but this was not feasible given the diverse geographic background of the panellists in this study.

Conclusions

A multi-national and multi-disciplinary group of experts achieved consensus on recommendations regarding the principles of intensive care for very old patients, major decisions along the trajectory of these patients as well as infrastructure and service development. The implementation of our recommendations requires a detailed analysis of the resources available in a particular healthcare system and should proceed in a stepwise and adaptive fashion. Important issues to be addressed in the future are the interactions between clinical specialties to support the continuity of care and a decision-making that is aligned with the specific characteristics of very old patients.

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Figure legends

Figure 1.

Summary of strong recommendations which were based on ≥90% agreement in each of the three specialty groups (intensive care, geriatric and emergency medicine).