## Development of evidence-based clinical imaging guidelines : to supply the evidence for appropriateness of diagnostic imaging studies and radiation exposure levels of patients

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## ▢ Introduction

Radiologic examination that require radiation exposure for the purpose o f diagnosis of the disease in the medical field have been implemented. In th is regard the IAEA (International Atomic Energy Agency, under), the Internati onal Commission on Radiological Protection (ICRP) and other radiation contr ol related agencies/professional organizations recommend to comply the justi fication and optimization for the purpose of medical radiation exposure cont rol. However, activity to enhance the optimization over the last two decades are numerous, relatively less justification activity is not recognized as a probl em. The principle of justification should be considered first, before the opti mization principle, is an important step to determine whether or not unnece ssary radiation. In the field of radiology, individual countries around the wor ld have developed and are utilizing evidence-based clinical guidelines in ord er to augment clinical decision-making by physicians when requesting or pre

scribing a radiologic examination. This research is also one of these activity and will ultimately reduce unnecessary radiation exposure to the patient, and to develop a Korean 'evidence-based clinical guidelines for imaging' to ensur e proper enforcement of medical imaging tests.

## ▢ Development of 'Evidence-based clinical imaging guidelines'

I. Methodology for development of Korea clinical imaging guideline

The methodology for guidelines is an adaptation, adopting and redevelopin g guidelines. Developing the Korean clinical imaging guidelines (K-CIG) invol ved three stages, set-up (planning), adaptation, and finalization (Figure. 1). T he set-up stage (planning and composition) outlines a process to form comm ittees and clarify their roles. The adaptation stage involves the stepwise deve lopment process to draft the guideline. The finalization stage includes the pr ocess of completing the recommendation document based on evidence, unde rgoing external review, and obtaining final approval.

The adaptation process was divided into 8 stages, including 5 stages from selection of key questions to drafting of the guideline, and 3 stages from ext ernal review to final approval and at the finalization of the guideline. A dev eloped protocol is presented in the Appendix 1.

II. Committee composition

Two committees were involved in the development of the CIGs: the workin g group that writes the proposals, and the development committee, which is responsible for the overall planning and provides supports on research meth odologies. The working group was composed of 3-4 clinical imaging experts from the KSR subspecial societies, including the cardiovascular imaging, thor acic radiology, interventional radiology, breast imaging, neuroradiology and h ead & neck radiology, abdominal radiology, uroradiology, musculoskeletal rad iology, pediatric radiology, and thyroid radiology societies. The development committee is composed of clinical imaging experts, research methodology ex perts, and clinical guideline experts. Both committees contributed to improvi

ng the quality of the guidelines by providing their expertise at various steps in the development process and collaborating when needed.

In clinical imaging examination, there are end-users who refer and perfor m the examinations. Therefore, it is important to include their opinions into the development process. After drafting key questions, an official document was sent to related clinical academic societies, which are the expected end-users, asking members of an advisory committee consensus group for their cl inical advice and to review the draft. A finally a consensus group, consisting of 23 nominated members from the final 14 related societies, was then form ed composed. Members participated in the review of key questions at the ad aptation set-up stage, drafting of the proposal, and expert panel based inves tigation using the delphi method.

### ▢ Guideline adaptation process

All adaptation process begins after the training workshop for working grou ps. The final result of the acceptance process of adaptation is a key questio n specific recommendations, it is presented in the study. Step-by-step develo pment process of adaptation is presented in detail in the Appendix.

A draft of the recommendation document consists of recommendations wit h responsible for key questions, summary of the evidence, considerations for the recommendation, and references.

Level of evidence grading in K-CIG to assess the evidence level of indi vidual literature is composed of 5 elements aspects. After assessing evide nce level for individual literature, the overall evidence level for each key question is defined. They are categorized as high (I), moderate (II), low (III), or very low (IV).

Each recommendation document includes recommendation grading and overall evidence level. The recommendation grading for the K-CIG contai ns A, B, C, and I, indicating the direction of the recommendation.

The radiation level of different imaging examinations is currently included in multiple guidelines. As existing guidelines, the RRL is organized based on

effective dose, which represents the expected risk level of radiation exposure in an entire population for an imaging examination measured in mSv.

In the finalization of the recommendation document, delphi method is used. The agreement level for recommendation, recommendation grading, and evidence level range from strongly disagree [1] to strongly agree [9]. After conducting two rounds of assessment, the recommendation docume nt is finalized.

## ▢ Conclusion and Suggestion

In this study, the methodology for developing the evidence-based clinical i maging guidelines is published and the guidelines are developed by involving the clinical imaging specialists mainly and related clinical specialists.

The research is contributing to the ultimate goal of justifying the principle s to be implemented to protect patients from unnecessary radiation exposure and effective use of limited health care resources. For that, the results of thi s study will be disseminated as the Korean Clinical Imaging Guideline adapta tion activities at the International Atomic Energy Agency (IAEA). As a followi ng activity, the applicability and monitoring is recommended to achieve the ultimate justification principle be applied in clinical settings.

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## Keyword

: imaging test, clinical imaging guideline, appropriateness, justification of the medical radiation exposure