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Orientation phenomena for the $1s \rightarrow 2p_{\pm 1}$ atomic collisional excitations in quantum plasmas: Shielding and plasmon coupling

Young-Dae Jung^{1,*}

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¹⁾ Permanent address: Department of Applied Physics, Hanyang University, Ansan, Kyunggi-Do 426-791, South Korea. Electronic mail: ydjang@hanyang.ac.kr

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The influence of the plasmon coupling on the orientation phenomena for the $1s \rightarrow 2p_{\pm 1}$ atomic collisional transitions is investigated in quantum plasmas. The effective Hamiltonian model taking into account the quantum and plasma shielding effects is applied to describe the electron-hydrogenic ion interaction in quantum plasmas. The semiclassical method is employed to describe the states of the projectile electron and target system in order to investigate the variation of the collisional orientation parameter as a function of the impact parameter, plasmon coupling parameter, and plasma density. The results show that the orientation parameter is significantly affected by the plasmon coupling parameter and plasma density. The orientation parameter is also discussed.

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The author gratefully acknowledges Dr. M. Rosenberg for useful discussions and warm hospitality while visiting the Department of Electrical and Computer Engineering at the University of California, San Diego. This research was initiated while the author was affiliated with UCSD as a visiting professor.

Topics

- Plasmas
- Plasma physics
- Plasma states
- Plasma effects
- Plasma energies
- Plasma interactions
- Plasma density
- Plasma interactions

Photons

- Semiclassical methods

PHYSICS OF PLASMAS 19, 113301 (2012)

Orientation phenomena for the $1s \rightarrow 2p_{\pm 1}$ atomic collisional excitations in quantum plasmas: Shielding and plasmon coupling

Young-Dae Jung¹⁾
Department of Applied Physics, Hanyang University, Ansan, Kyunggi-Do 426-791, South Korea and Department of Electrical and Computer Engineering, MC 0407, University of California, San Diego, 9500 Gilman Drive, La Jolla, California 92093-0407, USA

(Received 20 September 2012; accepted 19 October 2012; published online 1 November 2012)

The influence of the plasmon coupling on the orientation phenomena for the $1s \rightarrow 2p_{\pm 1}$ atomic collisional transitions is investigated in quantum plasmas. The effective Hamiltonian model taking into account the quantum and plasma shielding effects is applied to describe the electron-hydrogenic ion interaction in quantum plasmas. The semiclassical method is employed to describe the states of the projectile electron and target system in order to investigate the variation of the collisional orientation parameter as a function of the impact parameter, plasmon coupling parameter, and plasma density. The results show that the orientation parameter is significantly affected by the plasmon coupling parameter and plasma density. The orientation parameter is also discussed.

I. INTRODUCTION

The electron and ion have recombination processes have been studied in such as astrophysical plasmas, chemically, the electron has been used as a plasma arising out of the ionization on the physical environments. It shows the possibility from the $p_{\pm 1}$ (m). Since then the orientations have been investigated in detail collisional excitation potential in presented by the Yeh average energy is smaller than the Morevoer, it is to study the multipole interaction of multipole account to describe plasmas.¹³⁻¹⁵ In would not be recombination potential obtained charged particles due to the plasmon effect caused by the collective density fluctuations in hot quantum plasmas.¹⁶ Recently, there has been a great interest in exploring physical characteristics of quantum plasmas¹⁷⁻¹⁹ since quantum plasmas have been found in various microelectronics and

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atomic excitation cross section from an unperturbed atomic state $|n\rangle \equiv \Psi_{nlm}(\mathbf{r})$ to an excited state $|n'\rangle \equiv \Psi_{n'l'm'}(\mathbf{r})$ is represented by

$$\sigma_{n'n} = 2\pi \int b db |T_{n'n}(b)|^2, \quad (1)$$

where b is the impact parameter and $T_{n'n}(b)$ is the transition amplitude

*Permanent address: Department of Applied Physics, Hanyang University, Ansan, Kyunggi-Do 426-791, South Korea. Electronic mail: ydjang@hanyang.ac.kr

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Acta Cryst. (2006). D62, 1196-1207 [doi:10.1107/S0907444906030915]

Application of the structures of bacterial high-throughput technologies to the study of those of bacterial and eukaryotic targets, 175 novel proteins and the impact of several technologies on selected examples, including the design and optimization of crystallographic data collection and data reduction and optimized crystallographic data reduction and data reduction protocols

Authors: M. J. Fogg, P. Alzari, M. Carrondo, M. Coll, S. N. Manickam, N. Tarbouriech, T. ...

Abstract: The Structure of bacterial high-throughput technologies to the study of those of bacterial and eukaryotic targets, 175 novel proteins and the impact of several technologies on selected examples, including the design and optimization of crystallographic data collection and data reduction and data reduction protocols

Keywords: automation, data collection, data reduction, data reduction protocols

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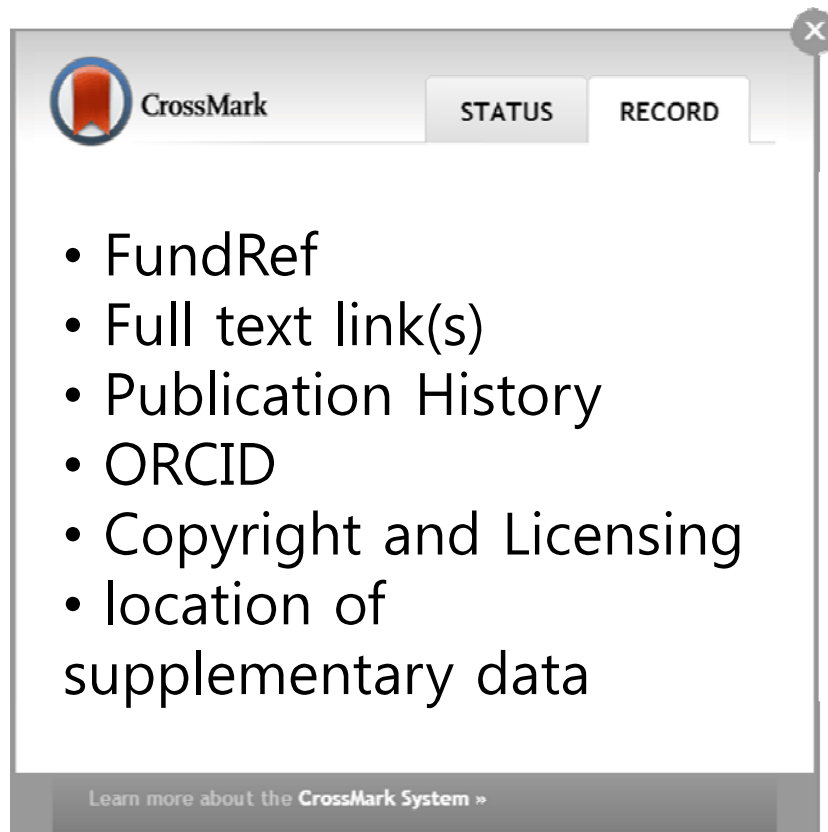
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Submitted: 4 February 2008, accepted: 20 March 2008, published: 26 May 2008

Optimization of the indications for allogeneic stem cell transplantation in Acute Myeloid Leukemia based on interactive diagnostic strategies

Maite Hartwig¹, Axel Rolf Zander¹, Torsten Haferlach²,
Boris Fehse^{1,3}, Nicolaus Kröger¹, Ulrike Bacher^{1*}

¹Interdisciplinary Clinic for Stem Cell Transplantation, University Medical Center Hamburg, Germany;
²MLL, Munich Leukemia Laboratory, Munich, Germany;
³Experimental Pediatric Oncology and Hematology, Hospital of the Johann Wolfgang Goethe-University, Frankfurt am Main, Germany

Correspondence: *Dr. med. Ulrike Bacher, MD, Interdisciplinary Clinic for Stem Cell Transplantation, University Medical Center Hamburg-Eppendorf, Martinistr. 52, 20246 Hamburg, Germany, Tel. 00494428034154, Fax. 00494428038097, Email: u.bacher@uke.de

Summary

The indications for allogeneic stem cell transplantation (SCT) in Acute Myeloid Leukemia (AML) represent a real challenge due to the clinical and genetic heterogeneity of the disorder. Therefore, an optimized indication for SCT in AML first requires the determination of the individual relapse risk based on diverse chromosomal and molecular prognosis-defining aberrations. A broad panel of diagnostic methods is needed to allow such subclassification and prognostic stratification: cytomorphology, cytogenetics, molecular genetics, and immunophenotyping by multiparameter flow cytometry. These methods should not be seen as isolated techniques but as parts of an integral network with hierarchies and interactions. Examples for a poor risk constellation as a clear indication for allogeneic SCT are provided by anomalies of chromosome 7, complex aberrations, or FLT3-length mutations. In contrast, the favorable reciprocal translocations such as the t(15;17)PML-RARA or t(8;21)AML1-ETO are not indications for SCT in first remission due to the rather good prognosis after standard therapy. Further, the indication for SCT should include the results of minimal residual disease (MRD) diagnostics by polymerase chain reaction (PCR) or flow cytometry. New aspects concerning the risk stratification in AML are discussed in this article. This article has been published in *Cellular Therapy and Transplantation*, Vol. 1, No. 1, 26 May 2008, p. 18-24, doi: 10.3205/ctt2008-05-26-001-en

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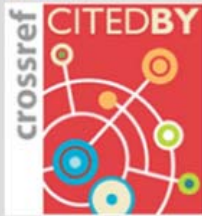
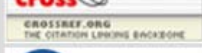
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Improved Detection of Ischemic Heart Disease by Combining High-Frequency Electrocardiogram Analysis with Exercise Stress Echocardiography

Jin-Oh Choi, MD, Sung-A Chang, MD, Sung Ji Park, MD, Sang-Chol Lee, MD, and Seung Woo Park, MD
Department of Medicine, Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, Korea

Background and Objectives: Because the exercise treadmill test (ETT) based on ST-segment analysis is limited due to low sensitivity and specificity, there has been an interest in the additional analysis of high-frequency components of QRS (HFQRS) for the detection of coronary artery disease (CAD). We sought to evaluate the feasibility and clinical usefulness of HFQRS analysis during exercise stress echocardiography (ESE).

Subjects and Methods: We evaluated 175 patients (age 57 ± 9 , 118 men) who performed ESE and either coronary computed tomographic angiography or coronary angiography. ETT was performed using the HyperQ stress system for both conventional ST-segment analysis and HFQRS intensity analysis.

Results: Thirty-two patients (31%) had significant CAD. The sensitivity and specificity of HFQRS analysis were 68% and 76%, respectively. The combined model, including HFQRS analysis and ESE, provided the best diagnostic accuracy, with the area under the characteristics curve (AUC) of 0.948 (95% confidence interval [CI] 0.913–0.984) compared with ST-segment analysis (AUC 0.892, 95% CI 0.852–0.938).

Conclusion: HFQRS analysis during ESE is feasible and may provide additional diagnostic information for the detection of CAD. (Korean Circ J 2013;43:674–680)

KEY WORDS: Treadmill test; Echocardiography, stress; Electrocardiography; Coronary artery disease.

Acknowledgments

The study was supported by a grant (No. 2008-10) from the Korean Society of Cardiology.

BSP Ltd. provided technical support for the HyperQ Stress System.

kcj Korean Circulation Journal

Jin-Oh Choi, et al. 679

Seventy-one patients were excluded due to poor ECG quality for HFQRS analysis. We assumed that this might be due to noisy signals contaminated during the acquisition of baseline resting echocardiographic images, and tried to exclude these noisy signals by separating the baseline echocardiographic image acquisition from baseline HFQRS measurement processes. After we adopted this exclusion of baseline echocardiogram and HFQRS signal acquisition, cases excluded due to poor ECG quality were substantially reduced.

In our study, the sensitivity of HFQRS analysis was greater than ST-segment analysis, which may suggest a complimentary role for HFQRS analysis to ETT in the diagnosis of significant CAD. Moreover, the independent relationship with significant CAD in multivariable analysis supports its role at the time of ESE. To the best of our knowledge, the feasibility of HFQRS analysis at the time of ESE has been demonstrated for the first time in our study.

such as myocardial perfusion or coronary functional studies is required for HFQRS analysis to be considered a reliable and standard diagnostic test for CAD.

Acknowledgments

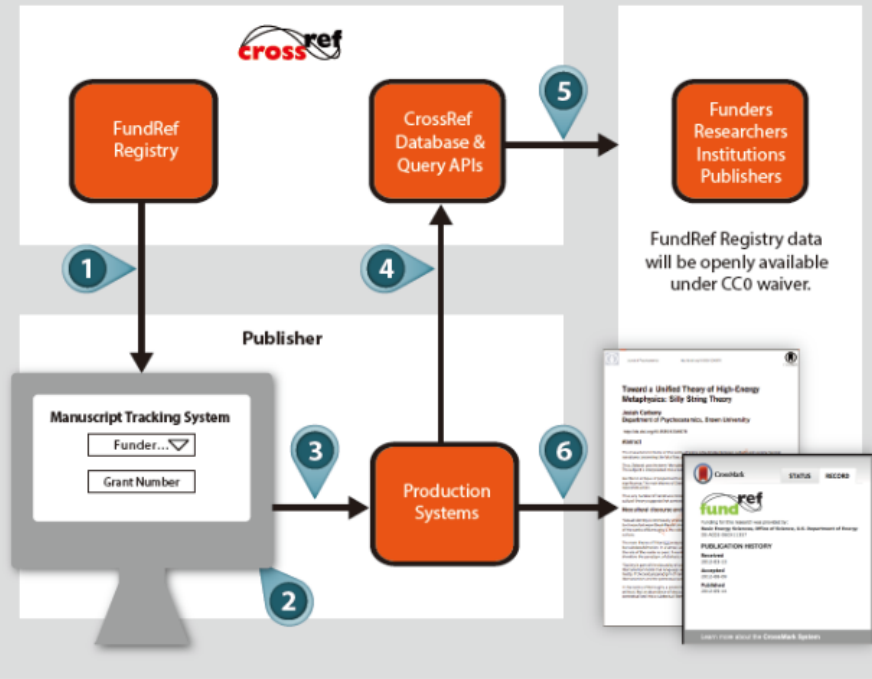
The study was supported by a grant (No. 2008-10) from the Korean Society of Cardiology.
BSP Ltd. provided technical support for the HyperQ Stress System.

References

1. Gibbons RJ, Balady GJ, Bricker JT, et al. ACC/AHA 2002 guideline update for exercise testing: summary article: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Update the 1997 Exercise Testing Guidelines). *Circulation* 2002;106:1983-92.

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Prevention of Venous Thromboembolism, 2nd Edition: Korean Society of Thrombosis and Hemostasis Evidence-Based Clinical Practice Guidelines

Soo-Mee Bang,^{1,*} Moon Ju Jang,^{2,*} Kyoung Ha Kim,³ Ho-Young Yhim,⁴ Yeo-Kyeong Kim,⁵ Seung-Hyun Nam,⁶ Hun Gyu Hwang,⁷ Sung Hwa Bae,⁸ Sung-Hyun Kim,⁹ Yeung-Chul Mun,¹⁰ Yang-Ki Kim,³ Inho Kim,¹¹ Won-Il Choi,¹² Chul Won Jung,¹³ Nan Hee Park,¹⁴ Nam-Kyong Choi,¹⁴ Byung-Joo Park,¹⁵ and Doyeun Oh¹²

¹Department of Internal Medicine, Seoul National University College of Medicine, Seoul National University Bundang Hospital, Seongnam, Korea.

²Department of Internal Medicine, School of Medicine, CHA University, Seongnam, Korea.



³Department of Internal Medicine, Soonchunhyang University College of Medicine, Seoul, Korea.

⁴Department of Internal Medicine, Chonbuk National University Medical School, Jeonju, Korea.

⁵Department of Internal Medicine, Chonnam National University Medical School, Gwangju, Korea.



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ORCID

Soo-Mee Bang

<http://orcid.org/0000-0002-0938-3007>

Moon Ju Jang

<http://orcid.org/0000-0001-7440-7573>



Guidelines, published in 2012, emphasized the importance of clinically relevant events as opposed to asymptomatic outcomes with preferences for both thrombotic and bleeding outcomes. Thus, in the development of the new Korean guidelines, three major points were addressed: 1) the new guidelines stratify patients into 4 risk groups (very low, low, moderate, and high) according to the actual incidence of symptomatic VTE from the HIRA databases; 2) the recommended optimal VTE prophylaxis for each group was modified according to condition-specific thrombotic and bleeding risks; 3) guidelines are intended for general information only, are not medical advice, and do not replace professional medical care and/or physician advice.

Graphical Abstract

Risk	Surgery or condition	Prophylaxis
Very low	Breast cancer	Early ambulation
	Gastric cancer (< 60 years)	
	Hepatobiliary cancer (< 60 years)	
	Cesarean section	
	Hysterectomy of benign disease	
	Oophorectomy of benign disease	
	Nephrectomy	
	Cystectomy	
	Prostatectomy	
	Transurethral resection of the prostate	
Low	Gastric cancer (≥ 60 years)	Mechanical prophylaxis
	Hepatobiliary cancer (≥ 60 years)	
	Cervical cancer	
Moderate	Colorectal cancer	Mechanical prophylaxis* or Pharmacological prophylaxis
	Pancreatic cancer	
	Ovarian cancer	
	Esophageal cancer	
	Major orthopedic surgery (THA, TKA, or HFS)	
	Major trauma	
High	Any cancer surgery in patients with previous VTE or thrombophilia	Pharmacological prophylaxis (± mechanical prophylaxis)
	Major orthopedic surgery with risk (advanced age, previous VTE or thrombophilia)	
	Spinal cord injury	

Keywords: Guideline, Prevention, Venous Thromboembolism, Bleeding.

INTRODUCTION

Venous thromboembolism (VTE), which includes deep vein thrombosis (DVT) and pulmonary embolism (PE), is a major cause of morbidity and mortality in hospitalized patients. PE is the third most common fatal vascular disorder following coronary artery disease and cerebrovascular accident (1); it is also the leading cause of preventable hospital death and a major cause of maternal mortality (2,3). In addition to the clinical impact of VTE on morbidity and mortality, the economic burden of the disease is considerable (4). Thus, VTE is a major public health concern in developed countries.

For the treatment of VTE, thromboprophylaxis has been recommended based on the four following factors: the high incidence of VTE in hospitalized patients; the difficulty of early diagnosis due to vague symptomatology; the cost-effectiveness of medical prophylaxis; and the high mortality of PE without early diagnosis and prompt management. Furthermore, data from numerous clinical trials

ORCID:

Soo-Mee Bang
<http://orcid.org/0000-0002-0938-3007>

Moon Ju Jang
<http://orcid.org/0000-0001-7440-7573>

Kyoung Ha Kim
<http://orcid.org/0000-0001-8842-4761>

Ho-Young Yhim
<http://orcid.org/0000-0002-1252-5336>

Yeo-Kyeoung Kim
<http://orcid.org/0000-0001-5447-4285>

Seung-Hyun Nam
<http://orcid.org/0000-0002-5736-2606>

Hun Gyu Hwang
<http://orcid.org/0000-0001-9304-7219>

Sung Hwa Bae
<http://orcid.org/0000-0002-5279-6341>

Sung-Hyun Kim
<http://orcid.org/0000-0002-5051-2413>

Yeung-Chul Mun
<http://orcid.org/0000-0002-1882-3983>

Yang-Ki Kim
<http://orcid.org/0000-0003-4221-6689>

Inho Kim
<http://orcid.org/0000-0002-3135-6312>

Won-Il Choi
<http://orcid.org/0000-0001-7705-0098>

Chul Won Jung
<http://orcid.org/0000-0002-5474-6807>

Nam-Kyong Choi
<http://orcid.org/0000-0003-1153-9928>

Doyeun Oh
<http://orcid.org/0000-0002-6981-3144>

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¹Department of Internal Medicine, Seoul National University College of Medicine, Seoul National University Bundang Hospital, Seongnam; ²Department of Internal Medicine, School of Medicine, CHA University, Seongnam; ³Department of Internal Medicine, Soonchunhyang University College of Medicine, Seoul; ⁴Department of Internal Medicine, Chonbuk National University Medical School, Jeonju; ⁵Department of Internal Medicine, Chonnam National University Medical School, Gwangju; ⁶Department of Internal Medicine, VHS Medical Center, Seoul; ⁷Department of Internal Medicine, Soonchunhyang University College of

In 2010, we proposed the first Korean Guidelines for the Prevention of Venous Thromboembolism (VTE). It was applicable to Korean patients, by modifying the contents of the second edition of the Japanese guidelines for the prevention of VTE and the 8th edition of the American College of Chest Physicians (ACCP) evidence-based clinical practice guidelines. From 2007 to 2011, we conducted a nationwide study regarding the incidence of VTE after major surgery using the Health Insurance Review and Assessment Service (HIRA) database. In addition, we have considered the 9th edition of the ACCP Evidence-Based Clinical Practice Guidelines, published in 2012. It emphasized the importance of clinically relevant events as opposed to asymptomatic outcomes with preferences for both thrombotic and bleeding outcomes. Thus, in the development of the new Korean guidelines, three major points were addressed: 1) the new guidelines stratify patients into 4 risk groups (very low, low, moderate, and high) according to the actual incidence of symptomatic VTE from the HIRA databases; 2) the recommended optimal VTE prophylaxis for each group was modified according to condition-specific thrombotic and bleeding risks; 3) guidelines are intended for general information only, are not medical advice, and do not replace professional medical care and/or physician advice.

Keywords: Guideline; Prevention; Venous Thromboembolism; Bleeding

failure, myocardial infarction, cerebrovascular attack, metastatic cancer, or previous VTE, we recommend pharmacological prophylaxis or mechanical prophylaxis (Grade 2C). The majority of patients admitted to the intensive care unit have multiple risk factors for VTE. These patients should be routinely assessed and offered pharmacological prophylaxis or mechanical prophylaxis (Grade 2A). For metastatic cancer patients who have previous VTE or thrombophilia, we recommend pharmacological prophylaxis (Grade 2A). Mechanical prophylaxis can be used when there is a contraindication to anticoagulation (Grade 1A) (Table 6).

SUMMARY

These guidelines emphasize strategies for the prevention of VTE in Korean patients experiencing surgery, pregnancy, trauma, cancer, and acute medical illness. Based on VTE risk factors (age, immobility, history of VTE, co-morbid illness, and type of surgery or trauma), patients can be stratified into very-low-, moderate-, and high-risk groups. For high-risk patients (any cancer surgery with previous VTE or thrombophilia, major orthopedic surgery with additional risk, and SCI), pharmacological prophylaxis is recommended. Mechanical prophylaxis should be used primarily in patients with a high risk of bleeding. For moderate-risk patients (colorectal or pancreatic cancer surgery, major orthopedic surgery without additional risk, and major trauma), prophylaxis with a mechanical method (GCS and/or IPC) or a pharmacological method can be used. For low-risk patients (gastric cancer surgery [≥ 60 yr], hepatobiliary cancer surgery [≥ 60 yr], and hysterectomy [cervical cancer]), mechanical prophylaxis is recommended. For very-low-risk patients, early and frequent ambulation is the only recommended prophylactic treatment. In conclusion, this article outlines the revised Korean guidelines issued for primary VTE prevention and provides a useful reference for clinicians. These guidelines must be updated based on results of well-controlled studies conducted in Korea. Our guidelines aim to define and clarify an optimal strategy for VTE prevention for patients with VTE risk; however, the ultimate decision should be individualized and determined by the physician.

DISCLOSURE

The authors declare that they have no conflicts of interest for this study.

ORCID

Soo-Mee Bang <http://orcid.org/0000-0002-0938-3007>
Moon Ju Jang <http://orcid.org/0000-0001-7440-7573>
Kyoung Ha Kim <http://orcid.org/0000-0001-8842-4761>

Ho-Young Yhim <http://orcid.org/0000-0002-1252-5336>
Yeo-Kyeong Kim <http://orcid.org/0000-0001-5447-4285>
Seung-Hyun Nam <http://orcid.org/0000-0002-5736-2606>
Hun Gyu Hwang <http://orcid.org/0000-0001-9304-7219>
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Sung-Hyun Kim <http://orcid.org/0000-0002-5051-2413>
Yeung-Chul Mun <http://orcid.org/0000-0002-1882-3983>
Yang-Ki Kim <http://orcid.org/0000-0003-4221-6689>
Inho Kim <http://orcid.org/0000-0002-3135-6312>
Won-Il Choi <http://orcid.org/0000-0001-7705-0098>
Chul Won Jung <http://orcid.org/0000-0002-5474-6807>
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Doyeun Oh <http://orcid.org/0000-0002-6981-3144>

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