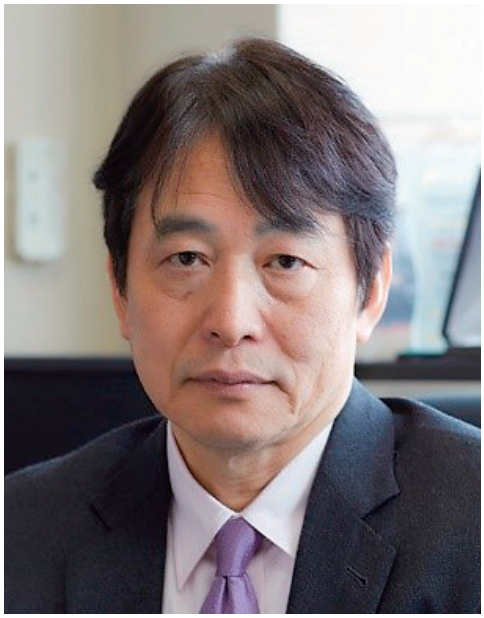
（会　告）

公益社団法人日本超音波医学会

第 23 回特別学会賞受賞者



工藤　正俊（1954 -）

工藤　正俊先生の受賞を称えて

この度，工藤正俊先生が日本超音波医学会第 23 回特別学会賞を受賞されました．工藤先生の受賞を称えて，これまでの工藤先生の歩まれた道のりと業績を紹介させて頂きます．

工藤先生は 1978 年京都大学医学部を卒業され，同大学医学部附属病院にて 1 年間研修医として勤務されました．その後，1979 年より神戸市立中央市民病院（現，神戸市立総合医療センター中央市民病院）にて 1 年間の内科総合研修医，翌 1980 年からは消化器内科後期レジデント，医員，副医長，医長として 1997 年までの 18 年もの長きにわたり同病院に勤務し消化器内科全般の診療，特に肝細胞癌の診断・治療に関する臨床研究に従事されました．その間，1987 年から 1989 年の 2 年間は米国 California 大学 Davis Medical Center にご留学されています．その後，1997 年からは近畿大学第 2 内科学講座助教授，1999 年からは新設された同大学消化器内科学講座の初代主任教授に就任され現在に至っておられます．この間 2008 年から 2014 年の 3 期 6 年附属病院長も務められました．現在は「学校法人　近畿大学」理事会の医学部担当理事として医学部および病院運営全体の統括責任者としての重責を負いながら消化器内科学主任教授も兼任されておられます．

1. 超音波医学に関する研究業績

工藤正俊先生は 2021 年 9 月時点で，総英文論文数 1, 071 編（IF : 7632. 942, Citation : 38, 790 H-Index 89）の業績を上げておられますが，そのうちの多くのものが超音波医学に関するものであります．特筆すべきは 1980 年代に世界で初めて独自に考案された CO_2 Microbubble を肝動脈に注入して行う動注造影エコー法（CO_2 US angiography）の開発と確立・普及であります．この手法により当時の日本で大きな解決すべきテーマであった超音波 B-mode 法では検出されても血管造影では何の所見も得られない結節の病態解明，早期肝癌の血流動態の解明，微小肝癌の早期発見，微小肝腫瘍の鑑別診断への応用など幅広くこの領域の進歩・発展に貢献されました[1–3]．これらの業績が認められ「早期肝癌の病理学的診断コンセンサス論文」の共著者として世界に早期肝癌の概念および画像所見の特徴を広めることにも寄与されました[4]．また WHO の「WHO Classification

of Tumours of the Digestive System」第4版における HCC の項目の book chapter の共著者として早期肝細胞癌の画像診断の解説を担当し日本から世界に早期肝癌の概念および血流動態の特徴・診断法を広めることにも貢献されました[5]．また，カラードプラ法を用いた動脈，門脈の分離診断なども行い肝癌結節内の血流と悪性度の相関に関する知見も世界で初めて報告されました．この動注造影エコー法の開発により静注造影剤開発の機運が世界的に高まりましたが，工藤先生は様々な企業との共同研究を開始し，特に第一世代造影剤 Levovist の臨床試験・開発にも深く携わりました．工藤先生は Levovist の承認後，多くの論文発表をされましたが，特にそれらの論文を集約し「肝腫瘍の診断と治療における超音波造影剤の役割」を体系的にまとめた書籍を2001 年に医学書院から日本語[6]，および 2003 年には Springer から英文で Textbook を発刊されておられます[7]．さらには，本邦で世界に先駆けて承認された第二世代超音波造影剤 Sonazoid の開発にも深く携わられました．また Sonazoid が発売されてからも Defect Re-perfusion 法という画期的な手法を開発されました[8]．この手法は SonoView では適応できない Sonazoid ならではの手法であります．Sonazoid 造影エコー法では Kupffer phase で肝臓全体が白く染影されますが，その Kupffer phase では「生きている癌部」も「Ablation で壊死になった癌部」も両方ともに Defect として描出されます．この時相で，もう一度 Sonazoid を静注することにより「生きている癌部」のみが造影されることを利用して Ablation などの際の極めて有効な治療ガイドとなるという独創的なアイデアを世界で初めて着想され論文発表されました[8]．現在ではこの手法は肝癌臨床ではなくてはならない日常的に行われる手法として確立されるに至っています．さらにはこの手法を肝細胞癌の screening にも応用できるのではないかと考え，CEUS による肝細胞癌の早期発見を B-mode と比較する第 3 相多施設共同ランダム化比較試験を行われ Sonazoid 造影エコーで Screening する方が B-mode で screening するよりも肝細胞癌の早期発見に繋がる，という Evidence を確立されました[9]．

また 1999 年 4 月に消化器内科学の主任教授に就任されてからは新しい肝癌治療法も積極的に導入され同年 6 月には日本の中でも一早く超音波ガイド下のラジオ波焼灼療法（RFA）を導入し日本国内でも RFA 治療患者数においては東京大学についで 2－3 番目にランクインされるなど，多くの患者さんにこの低侵襲治療を行う体制を構築されました．また RFA の効果や安全性向上性のための TACE 先行 RFA，人工胸水下 RFA，人工腹水下 RFA や ENBD tube 挿入下の RFA などの導入も行い RFA 治療成績・安全性の向上にも尽力されました[10]．その他，2014 年から厚生労働省科学研究費を獲得して肝臓領域における超音波エラストグラフィの開発・研究事業を 3 年間行い（2 年目からは AMED 研究費）Elastography の有用性を確立し，この研究成果の結果 Elastography が保険承認を受けることに繋がりました．さらには工藤先生が日本超音波医学会の理事長（2016－2020 年）の時代にその成果をもとに Elastography の JSUM guideline を 3 つの領域（基礎，肝臓，乳腺）で作成する事業を推進し JSUM 機関紙に論文発表致しました[11]．

2. 日本超音波医学会における貢献

工藤正俊先生は 2000 年から 2020 年までの長きにわたり日本超音波医学会の理事（2000－2010 年），副理事長（2010－2014 年），理事長（2014－2020 年）として 20 年間，理事会の一員として学会の発展のために貢献されました．委員会活動としては 2002 年から 2020 年に至るまで国際交流委員会委員長を 18 年間務められアジアからの留学生を日本国内各施設で受け入れる事業に尽力され，またアジアの様々な地域で行われる AFSUMB や WFUMB 主催の教育 workshop に JSUM 代表として教育講演活動を精力的に続けてこられました．

また工藤先生は第 83 回日本超音波医学会学術集会会長として 2010 年京都国際会館で学術集会を主催され盛会裏に遂行されました．さらに 2016 年には AFSUMB 2016 会長ならびに ACUCI（Asian Conference on Ultrasound Contrast Imaging）2016 会長と JSUM との同時開催にあたり 2 度目の会長となる第 89 回日本超音波医学会学術集会の会長も務められました．この学会は日本乳腺甲状腺超音波医学会（JABTS）（古川まどか会長）も加えた 4 学会共同開催の Ultrasonic Week 2016 として約 6, 000 名の参加者を得て盛会裏に終了することができました．また AFSUMB は 2016 年で設立 30 周年を迎えるため記念式典を盛大に行いましたが宮家からは高円宮妃久子様をお迎えし華やかな雰囲気のもと Opening ceremony が執り行われました．

また 2019 年からは日本超音波医学会として AMED

の「超音波デジタル画像のビッグデータベース構築と人工知能実装化事業」に応募し見事に採択され現在も消化器，乳腺，循環器の領域で AI 診断を社会実装化すべく 2021 年時点で全国の 21 施設を束ねて超音波の AI 診断を各企業の製品化された超音波装置に実装させるべく着々と成果を出されています．また椎名 毅先生と共に超音波 AI 診断のテキストブックも出版されました[12]．これらの超音波医学会における功績により 2020 年には日本超音波医学会の名誉会員の称号が贈られています．

3. 国際貢献活動

工藤先生は 2001 年からアジア超音波医学会（AFSUMB）の理事（Councilor）に就任された後，財務担当理事（Treasure），庶務担当理事（Secretary），副理事長（Vice President），次期理事長（President-elect）を経て 2016 年から 2018 年まで理事長（President）として前理事長（Immediate Past President）の 2 年間を含め 20 年間の長きにわたり AFSUMB の発展に貢献されました．特に AFSUMB 理事長の時期に理事会で決議した「造影 EUS の診療ガイドライン」作成事業はその後，和歌山県立医科大学第二内科教授の北野雅之理事のご尽力により無事出版にこぎつけました[13]．また AFSUMB 前理事長（Immediate Past-President）の時期（2019 年－2020 年）には韓国の Dr. Choi と協力し AFSUMB の Sonazoid 造影エコーのガイドライン作成にも尽力されました[14, 15]．

一方，工藤先生は 2003 年から世界超音波医学会（WFUMB）の理事に就任された後，副理事長（Vice President），次期理事長（President-elect）を経て 2011 年からは WFUMB の理事長（President）に就任されました（2011－2013 年）．次期理事長（President-elect）の時代（2009－2011 年）には当時の President であった Dr. Michel Claudon と共同で「WFUMB 肝腫瘍造影エコーのガイドライン」作成に尽力されました[16, 17]．このガイドラインは最近，また改訂が行われております[18]．またご自身の WFUMB 理事長（President）の時代には超音波 Elastography のガイドラインを基礎，肝臓，乳腺の 3 領域でエビデンスを集積し世界のエラストグラフィのエキスパートとによるコンセンサス会議を Washington DC とシカゴで 2 回行った後，この 3 領域のガイドラインを WFUMB 機関紙である UMB に掲載されました[19–23]．

また，工藤先生は 2013 年 5 月にサンパウロで開かれた第 14 回世界超音波医学会の学会長（Congress President）も務められました（Dr. Leandro Fernandz, Dr. Giovauni Guido Cerri との 3 人の Congress Co-Presidents）．WFUMB においても実に前理事長の任期（2013－2015 年）までの 13 年の長きにわたり WFUMB の発展に貢献されました．また 2021 年からは米国放射線学会で積極的に推進している造影超音波検査の診断基準である LI-RADS のメンバーとしてもご活躍中であります．

4. 諸外国からの超音波医学への貢献に対する顕彰

上記に述べたような工藤先生の超音波医学における国際貢献に対してボローニャ大学医学部医学会（2006 年 9 月 15 日），フィリピン超音波医学会（2008 年 3 月 19 日），米国超音波医学会（2011 年 4 月）ルーマニア超音波医学会（2011 年 6 月），韓国超音波医学会（2018 年 5 月 25 日），台湾超音波医学会（2018 年 10 月 13 日）から名誉会員の称号を授与されています．また韓国超音波医学会からは JISAN Lecture Award（2010 年 5 月）も授与されています．また数多くの英文論文が多数，引用され 10 年以上にわたって被引用回数が世界の上位 1％以内に入る論文を毎年出版している著者のみに授与される Highly Cited Researchers（Clarivate Analytics 社）の臨床医学部門において 2019，2020，2021 年の 3 年間，連続受賞されています．臨床医学部門において Highly Cited Researchers に選出されたのは 3 年間を通じて日本人では唯一，工藤正俊先生のみであり改めてその論文の質の高さに感銘を受ける次第です．

（近畿大学医学部消化器内科　南　康範）

2021 JSUM Prize Winner

Masatoshi KUDO, MD, PhD（1954 -）

It is our great pleasure to write here to congratulate Dr. Masatoshi Kudo on his being awarded the 23rd Special Award of the Japan Society of Ultrasonics in Medicine（JSUM）. To honor Dr. Kudo for his award, I would like to outline Dr. Kudo's successful career and numerous achievements.

Dr. Kudo graduated from Kyoto University School of Medicine in 1978 and served as a junior resident for 1 year at Kyoto University Hospital. Beginning in 1979, he was a general resident in the Department of Internal Medicine at Kobe City Medical Center General Hospital and subsequently served as a senior resident in the Department of Gastroenterology, followed by deputy director from 1980 to 1997. He has been engaged in clinical practice and research on general gastrointestinal disorders, with an emphasis on hepatocellular carcinoma（HCC）. He worked at the University of California Davis Medical Center in the United States from 1987 to 1989 as a post-doctoral research fellow. In 1997, he was appointed as associate professor in the Second Department of Internal Medicine at Kindai University and was promoted to First Professor and Chairman of the newly founded Department of Gastroenterology and Hepatology at Kindai University in 1999. He served three terms as Director of Kindai University Hospital from 2008 to 2014. As a trustee of the Faculty of Medicine Executive Council Board of Kindai University, Dr. Kudo currently supervises general operations of the Faculty of Medicine and its hospital and also serves as the Chairman of the Department of Gastroenterology and Hepatology.

1. Research achievements in the field of ultrasonography

As of September 2021, Dr. Masatoshi Kudo has published 1,071 English papers（IFs：7632.942, citations：38,790, H-Index：89）, many of which are on ultrasonography（US）. He is known for his work in the development and establishment of a novel arterial contrast-enhanced US（CEUS）（CO_2 US angiography）in the 1980s, in which CO_2 microbubbles are injected into the hepatic artery to differentiate small liver tumors. This method was a major breakthrough in elucidating the pathology of hepatic nodules, which were detected only by B-mode US, but not by angiography. Dr. Kudo has also greatly contributed to developments in this field, such as evaluation of hemodynamics in early-stage hepatocellular carcinoma（HCC）, early detection of small HCCs, and their application in differential diagnoses of liver tumors [1–3]. These achievements were acknowledged and have contributed to expanding knowledge on findings and imaging features of early-stage HCC, especially by co-authoring the following paper：“Pathologic diagnosis of early hepatocellular carcinoma：a report of the international consensus group for hepatocellular neoplasia” [4]. In addition, as a co-author of the chapter on HCC in the 4th edition of the “WHO Classification of Tumours of the Digestive System,” he described the imaging of early HCC and has notably contributed to disseminating the concepts of early-stage HCC and its hemodynamic characteristics and diagnostic methods around the world [5]. His team was also the first to report a correlation between intramodular blood supply and tumor malignancy by using CO_2 US and color Doppler imaging to differentiate between intranodular hepatic arterial and portal venous flow. While the development of this intraarterial contrast US method has evoked research in the development of intravenous contrast agents worldwide, Dr. Kudo has also initiated collaborative research with various companies and played a particularly important role in several clinical trials and in the development of the first-generation contrast agent Levovist. Dr. Kudo has further published several studies after the approval of Levovist, the essence of which has been published as a textbook on the roles of CEUS in the diagnosis and treatment of hepatic neoplasms in Japanese [6] from Igakushoin in 2001 and as a textbook from Springer in English in 2003 [7]. Dr. Kudo was also deeply

involved in developing Sonazoid, a second-generation ultrasound contrast agent, that was pioneered and first approved in Japan. After the launch of Sonazoid, he developed a revolutionary method called "defect reperfusion imaging" [8] uniquely utilized for Sonazoid as SonoView cannot be used with it. The entire liver parenchyma is demonstrated as white on CEUS with Sonazoid in the Kupffer phase, whereas both "viable cancer" and "ablated necrotic cancer" are visualized as defects during the Kupffer phase. With this innovative technique, CEUS with Sonazoid enables clear visualization of viable cancerous tissue by a second injection in the Kupffer phase, which leads to clear visualization of viable lesions only, resulting in successful treatment guidance in ablation as well as other treatments [8]. Today, this procedure has become a routine and indispensable clinical technique for HCC and has been further proven to be useful in the screening of HCC. A phase III multicenter, randomized, controlled trial with Sonazoid CEUS screening has established evidence that Sonazoid CEUS is more effective in the detection of small HCC than with B-mode US [9].

Since his appointment as Chairman of the Department of Gastroenterology and Hepatology in April 1999, Dr. Kudo has also actively introduced novel therapies in HCC treatment. In June of the same year, he was a pioneering force in the application of ultrasound-guided radiofrequency ablation (RFA) in Japan, treating a high volume of patients with RFA, second only to the University of Tokyo among Japanese institutions, thus establishing a system that provides minimally invasive treatment to many patients. His team also introduced transcatheter arterial chemoembolization (TACE)-RFA combination therapy, RFA with artificial pleural effusion and artificial ascites, and RFA with endoscopic nasobiliary drainage (ENBD) tube to improve the outcomes and safety of RFA treatment [10]. In addition, his team was granted Ministry of Health, Labour and Welfare Scientific Research funding in 2014 for a 3-year project on the study of US elastography (funded by a Japan Agency for Medical Research and Development [AMED] grant from the second year) to establish the efficacy of this technique, which led to the approval of elastography as an insurance-covered technique. In addition, Dr. Kudo conducted a project to create the JSUM guidelines for elastography in three areas (basics, liver, and breast) during his term as President of the WFUMB (2011－2013), and he also published a paper in Journal of Medical Ultrasonics [11], which was cited in the WFUMB elastography guidelines.

2. Contributions to the JSUM

Dr. Masatoshi Kudo contributed to the development of JSUM as an Executive Council Board member for 20 years as a Councilor (2000－2010), Vice President (2010－2014), and President (2014－2020) of JSUM from 2000 to 2020. He also served as the Chairman of the International Affairs Committee from 2002 to 2020 and was devoted to the acceptance of Asian students to various Japanese institutions. He also actively continued his educational lecture activities by representing JSUM in educational workshops sponsored by the Asian Federation of Societies for Ultrasound in Medicine and Biology (AFSUMB) and the World Federation for Ultrasound in Medicine and Biology (WFUMB) in various regions of Asia.

Dr. Kudo also successfully held an annual scientific conference at the Kyoto International Conference Center in 2010 as the Congress Chairman of the 83rd Annual Scientific Conference of JSUM. In 2016, he also served as AFSUMB 2016 Congress Chairman and as the Congress Chairman of the Asian Conference on Ultrasound Contrast Imaging (ACUCI), which coincided with the 89th Annual Meeting of JSUM, for which he served as the Congress Chairman for the second time. This event was jointly held with the Japanese Society for Breast and Thyroid Ultrasonics (JABTS) (Congress Chairperson: Madoka Furukawa) as Ultrasonic Week 2016, a successful four-society joint meeting that attracted approximately 6,000 participants. In 2016, AFSUMB held a commemorative celebration to celebrate its 30th anniversary and had the honor of having her imperial highness Hisako, Princess of Takamado, attend the opening ceremony of the grand event.

In 2019, Dr. Kudo, as the President of JSUM, applied for AMED research funding for the Creation of Big Database for Digital Imaging of Ultrasound

and the Implementation of Artificial Intelligence in Ultrasound, which has been successfully adopted by JSUM. In order to implement AI diagnosis in the fields of liver tumor, breast tumor, and cardiology, 21 institutions throughout the country have been working together as of 2021 to implement AI diagnosis in commercialized ultrasound equipment from various companies. A textbook on AI ultrasound diagnostics was also published with Professor Tsuyoshi Shiina [12]. Dr. Kudo was named an honorary member of JSUM in 2020 to mark his achievements in JSUM.

3. International Contributions

After being appointed as a councilor of AFSUMB in 2001, Dr. Kudo has served AFSUMB for almost 20 years through his subsequent roles as the Treasurer, Secretary, Vice President, President-elect, and President from 2016 to 2018, and an additional 2 years as the Immediate Past President. In particular, a project to create the "Practice Guidelines for Contrast-Enhanced EUS" was initiated by Dr. Kudo during his term of presidency of AFSUMB, which was successfully finished and published by current Council member Dr. Masayuki Kitano, Professor of the Second Department of Internal Medicine, Wakayama Medical University [13]. During his period as the AFSUMB Immediate Past-President (2019－2020), he devoted his time and efforts to the development of AFSUMB guidelines for Sonazoid CEUS in collaboration with Dr. Choi, past President of AFSUMB [14, 15].

After he was appointed to the Council of WFUMB in 2003, Dr. Kudo was appointed as its President in 2011 (2011－2013), following his terms as the Vice President and President-elect. In his term as the President-elect (2009－2011), he collaborated with President Michel Claudon to create the "WFUMB guidelines and good clinical practice recommendations for CEUS in the liver" [16, 17], which was recently revised [18]. In his term as WFUMB President, the guidelines and recommendations for clinical use of ultrasound elastography were published in a WFUMB publication, covering its basic principles in Part I, applications to the liver in Part II, and the breast in Part III after accumulating evidence through two consensus meetings with experts in elastography held in Washington DC and Chicago [19–23].

Dr. Kudo also served as the Congress President of the 14th WFUMB Scientific Meeting in São Paulo in May 2013 (three Congress Co-Presidents with Dr. Leandro Fernandz and Dr. Giovauni Guido Cerri). He also contributed to the development of WFUMB for 13 years, including in the position of Immediate Past President (2013－2015). Since 2021, he has been an active member of LI-RADS, which is comprised of diagnostic criteria for CEUS, actively promoted by the American College of Radiology.

4. Recognition of Contributions to Ultrasonographic Medicine by Foreign Countries

Dr. Kudo has been named an honorary member of the Medical Society of Bologna University School of Medicine (September 15, 2006), the Philippine Society of Ultrasound in Clinical Medicine (March 19, 2008), the American Institute of Ultrasound in Medicine (April 2011), the Romanian Society of Ultrasound in Medicine and Biology (June 2011), the Korean Society of Ultrasound in Medicine (May 25, 2018), and the Taiwanese Society of Ultrasound in Medicine (October 13, 2018) for his great aforementioned achievements in this field. The JISAN Lecture Award (May 2010) has also been granted to Dr. Kudo by the Korean Society of Ultrasound in Medicine. In addition, a number of his English papers have been cited; furthermore, he has been awarded for three consecutive years from 2019 to 2021 as a Highly Cited Researcher by Clarivate Analytics, which is granted only to authors whose number of citations falls within the top 1% of the world for over a decade. Dr. Masatoshi Kudo is the only Japanese physician to be selected as a Highly Cited Researcher in Clinical Medicine through the 3 years, further affirming the quality of his research and distinguishing Dr. Kudo as one of the most influential researchers in ultrasound in medicine and beyond.

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