

November 28 (Tue.)

Room 2 (Tokyo Dome Hotel B1 Grand Ballroom TENKU (North))

Day 1

Room 2

10:30 ~ 11:45

Highlight Academic Session 1

Moderators Division of Emergency and Critical Care Medicine, Tohoku University Graduate School of Medicine Shigeki Kushimoto
Department of Emergency and Critical Care Medicine, The University of Tokyo Kent Doi

- HL1-1 Hour-1 bundle adherence was associated with reduction of in-hospital mortality among patients with sepsis in Japan
Osaka General Medical Center Yutaka Umemura
- HL1-2 Association between low body mass index and increased 28-day mortality of severe sepsis in Japanese cohorts
Department of Emergency and Critical Care Medicine, Chiba University Graduate School of Medicine Takehiko Oami
- HL1-3 Characteristics, management, and in-hospital mortality among patients with sepsis in Japan
Tsukuba Memorial Hospital / University of Tsukuba Toshikazu Abe
- HL1-4 rSIG as a simple and rapid assessment tool in initial sepsis management: multicenter comparisons with MEWS
Center Hospital of National Center for Global Health and Medicine Wataru Matsuda
- HL1-5 Impact of Body Temperature Abnormalities on the Implementation of Sepsis Bundles and Outcomes in Patients With Sepsis
Division of Emergency and Critical Care Medicine, Tohoku University Graduate School of Medicine Shigeki Kushimoto

13:40 ~ 14:40

Highlight Academic Session 2

Moderators Showa General Hospital Tetsuya Sakamoto
Department of Emergency and Critical Care Medicine, Kansai Medical University Kentaro Kajino

- HL2-1 End-of-Life Care in Out-of-Hospital Cardiac Arrest Patients: Multicenter Collaborative Study
Department of Preventive Services, Kyoto University Graduate School of Medicine Norihiro Nishioka
- HL2-2 ECPR in adult patients with OHCA: a retrospective large cohort multicenter study in Japan
Hyogo Emergency Medical Center Akihiko Inoue
- HL2-3 Private residence as a location of cardiac arrest may have a deleterious effect on the outcomes of non-shockable OHCA
Tertiary Emergency Medical Center, Tokyo Metropolitan Bokutoh Hospital Keita Shibahashi
- HL2-4 Prediction Model Developed Using Deep Learning For Termination Of Resuscitation in Out - of Hospital Cardiac Arrest
Department of Emergency and Critical Care Medicine, Kansai Medical University Kentaro Kajino

14:40 ~ 15:40

Highlight Academic Session 3

Moderators Non-profit organization Japan ECMO Network, Tokyo, Japan Shinichiro Ohshimo
Department of Emergency and Critical Care Medicine, Nippon Medical School Shoji Yokobori

- HL3-1 Multicenter chest CT registry for patients with severe ARDS requiring V-V ECMO in Japan: J-CARVE registry
Department of Emergency and Critical Care Medicine, Graduate School of Biomedical and Health Sciences, Hiroshima University Mitsuaki Nishikimi

- HL3-2 BEst National Estate for Disseminated Intravascular Coagulation Thesis (BENEDICT) Database
Department of Emergency and Critical Care Medicine, Osaka Medical and Pharmaceutical University Katsunori Mochizuki
- HL3-3 Prehospital stroke prediction algorithm for diagnosis and surgical intervention using machine learning
Department of Emergency and Critical Care Medicine, Chiba University Graduate School of Medicine Yosuke Hayashi
- HL3-4 Trends in survival during the pandemic in patients with critical COVID-19 receiving mechanical ventilation and ECMO
Non-profit organization Japan ECMO Network, Tokyo, Japan Shinichiro Ohshimo

15:45 ~ 17:00

Highlight Academic Session 4

- Moderators Department of Emergency and Critical Care Medicine, Kansai Medical University Yasuyuki Kuwagata
Department of Emergency and Critical Care Medicine, Tokyo Medical University Hospital Natsuo Kamimura
- HL4-1 Reverse Shock Index multiplied by Glasgow Coma Scale score as a point-of-care severity assessment for trauma management
Department of Emergency Medicine and Critical Care, Center Hospital of the National Center for Global Health and Medicine Tatsuki Uemura
- HL4-2 Early prediction models for new-onset functional impairment at hospital discharge of ICU admission
Department of Clinical Epidemiology and Health Economics, School of Public Health, The University of Tokyo Hiroyuki Ohbe
- HL4-3 Postintensive Care Syndrome-Family Associated With COVID-19 Infection~Single Center Observational Studies~
Department of Emergency and Critical Care Medicine, St. Luke's International Hospital, Tokyo, Japan Kasumi Shirasaki
- HL4-4 Efforts to develop a COVID-19 pneumonia severity prediction score using lung ultrasound
Department of Emergency Medicine, International University of Health and Welfare, School of Medicine, Narita Hospital, Chiba Takuro Endo
- HL4-5 Study of Advance Care Planning by Acute Care Physician (ACP-2 study)
Department of Emergency and Critical Care Medicine, Tokyo Medical University Hospital Natsuo Kamimura

November 29 (Wed.)

Room 2 (Tokyo Dome Hotel B1 Grand Ballroom TENKU (North))

9:00 ~ 10:00

Highlight Academic Session 5

	Moderators	Department of Traumatology and Critical Care Medicine, Osaka Metropolitan University Graduate School of Medicine Department of Emergency and Critical Care Medicine, Tokai University School of Medicine	Yasumitsu Mizobata Asuka Tsuchiya
HL5-1	A multicenter prospective study to validate prediction rules for CT among patients with minor head and neck trauma	Tokyobay Urayasu Ichikawa Medical Center	Hiraku Funakoshi
HL5-2	Association of trauma severity with antibody seroconversion in heparin-induced thrombocytopenia	Department of Emergency and Critical Care Medicine, Tohoku University Hospital	Motoo Fujita
HL5-3	Comparison of torso trauma and traumatic brain injury via plasma proteomic profiles; A prospective cohort study	Department of Traumatology and Acute Critical Medicine, Osaka University Graduate School of Medicine	Jotaro Tachino
HL5-4	FOLLOW-UP Trauma study -Preliminary Report-	Department of Emergency and Critical Care Medicine, Tokai University School of Medicine	Asuka Tsuchiya

10:10 ~ 11:10

Highlight Academic Session 6

	Moderators	Acute and Critical Care center, Nagasaki University Hospital Department of Emergency Medicine, Tokyo Dental College Ichikawa General Hospital	Osamu Tasaki Masaru Suzuki
HL6-1	Optimal Target Blood Pressure in Elderly with Septic Shock: OPTPRESS trial	Tsuchiura Kyodo General Hospital, Department of Acute Critical Care Medicine	Akira Endo
HL6-2	Levetiracetam versus fosphenytoin as a second-line treatment after diazepam for adult convulsive status epilepticus	Department of Critical Care Medicine, Yokohama City University Hospital	Kensuke Nakamura
HL6-3	RCT Assessing Temperature Management after OHCA with Moderate Initial Illness Severity (R-CAST OHCA): Study Plan 2023	Okayama University Faculty of Medicine, Dentistry, and Pharmaceutical Sciences, Department of Emergency, Critical Care, and Disaster Medicine	Hiromichi Naito
HL6-4	Hydrogen Inhalation Improves 90-Day Neurological Outcome in Post-Cardiac Arrest Syndrome: HYBRID II Trial	Department of Emergency Medicine, Tokyo Dental College Ichikawa General Hospital	Masaru Suzuki

14:50 ~ 15:50

Highlight Academic Session 7

	Moderators	Department of Trauma and Critical Care Medicine, Kyorin University Osaka Medical and Pharmaceutical University	Yoshihiro Yamaguchi Kazuma Yamakawa
HL7-1	Post Intensive Care Syndrome in Sepsis and Septic Shock: a multicenter prospective observational study - ILOSS Study	Tochigi Prefectural Emergency and Critical Care Center, Imperial Gift Foundation SAISEIKAI Utsunomiya Hospital	Takayuki Ogura
HL7-2	Development of antimicrobial strategy using Gram staining in the era of drug-resistant bacteria	Department of Traumatology and Acute Critical Medicine, Osaka University Graduate School of Medicine	Jumpei Yoshimura

- HL7-3 Occurrence and incidence rate of PIVC-related phlebitis and complications in critically ill patients
Infection Prevention and Vascular Access Group, The University of Queensland and Herston Infectious Diseases Institute Hideto Yasuda
- HL7-4 Identifying Sepsis Populations Benefitting from Anticoagulant Therapy: A Prospective Cohort Study.
Osaka Medical and Pharmaceutical University Kazuma Yamakawa

15:50 ~ 16:50

Highlight Academic Session 8

Moderators Department of Trauma and Acute Critical Care Medicine, Osaka University Hospital Jun Oda
Advanced Medical Emergency and Critical Care Center, Yamaguchi University Hospital Kotaro Kaneda

- HL8-1 Early Restricted Oxygen Therapy after Resuscitation from Cardiac Arrest (ER-OXYTRAC) trial
Keio University School of Medicine, Department of Emergency and Critical Care Medicine Ryo Yamamoto
- HL8-2 Incidence and Characteristics of Biphasic Anaphylaxis in the Covid-19 Era: A Multi-center Prospective Study
Yamamoto Memorial Hospital Seiro Oya
- HL8-3 Phase 2 study of intravenous perampanel in Japanese epilepsy patients -safety evaluation of alternative to oral dosing-
Hiroshima University Hospital Koji Iida
- HL8-4 Effects of mamushi antivenom serum: a multicenter prospective observational study (OROCHI study) analysis
Advanced Medical Emergency and Critical Care Center, Yamaguchi University Hospital Kotaro Kaneda

November 30 (Thu.)

Room 1 (Tokyo Dome City Theatre G-ROSSO)

8:30 ~ 9:30

Special Lecture 5

Moderator Department of Emergency Medicine, The Jikei University School of Medicine Satoshi Takeda

SL5 Modern Management of Acute Atrial Fibrillation

Distinguished Professor, University of Ottawa, and Senior Scientist of the Clinical Epidemiology Program, Ottawa Hospital Research Institute, Canada Ian G. Stiell

9:40 ~ 11:40

Proposed Collaboration Project Symposium of the 51st Annual Meeting of the Japanese Association for Acute Medicine and the 6th meetings of the EMS Asia 2023 Tokyo

Pandemic/post-pandemic resilience and digital transformation of EMS Asia – using technology to help emergency care–

Moderators Professor, Graduate School of Kokushikan University Hideharu Tanaka
Senior Consultant, Director of Research, and Clinician
Scientist, Department of Emergency Medicine in Singapore
General Hospital, Singapore Marcus ONG Eng Hock

EMS-1 Digital Transformation of EMS Asia:

The “Safe-Yunlin” Digital Health Network with Information Communication Technology and Service Innovation to Help Emergency Care in Taiwan

Professor of Emergency Medicine at National Taiwan University,
Superintendent of National Taiwan University Hospital, Yunlin Branch, Taiwan Matthew Huei-Ming Ma

EMS-2 New Strategy of Cardiopulmonary Resuscitation Training: Virtual Plus Training

Professor, Department of Emergency Medicine, Seoul National University College of Medicine and Hospital, Korea Sang Do Shin

EMS-3 The Future of Emergency Medicine Using Technology

-The Challenge of Smart119, a National University Startup in Japan-

Professor of Emergency and Critical Care Medicine,
Chiba University Graduate School of Medicine / CEO, Smart119 Inc. Taka-aki Nakada

EMS-4 An Overview of Future technologies for EMS

Director at the Digital and Smart Health Office and the Deputy Clinical Director,
Ng Teng Fong Centre for Healthcare Innovation, Singapore Yih Yng Ng

EMS-5 D1669: The Digital Transformation for Emergency Care Innovation in Thailand

Secretary-General of the National Institute for Emergency Medicine, Thailand Flt.Lt. Atchariya Pangma

13:10 ~ 14:00

Special Lecture 6

Moderator Department of Emergency and Disaster Medicine, Juntendo University Toshiaki Iba

SL6 Management of sepsis induced coagulopathy

Intensive Care Unit (MIR-NHC), Strasbourg University Hospital, France Julie Helms

Day 3

Room 1

14:10 ~ 15:00

Special Lecture 7

Moderator Department of Emergency and General Medicine,
Amagasaki General Medical Center Tatsuya Nishiuchi

SL7 Role of the Medical Director in EMS

Professor of Medicine/Cardiology, University of Washington, Department of Medicine,
Division of Cardiology, USA Peter J. Kudenchuk

15:10 ~ 15:40

Presidential Lecture

Moderator Professor of Emergency Medicine at National Taiwan University,
Superintendent of National Taiwan University Hospital, Yunlin Branch, Taiwan Matthew Huei-Ming Ma

PL2 Reverse Shock Index multiplied by Glasgow Coma Scale score (rSIG) as a point-of-care severity assessment for initial management of emergency patients

Director of Department of Emergency Medicine and Intensive Care Unit
Center Hospital of the National Center for Global Health and Medicine, Tokyo, Japan Akio Kimura

15:50 ~ 17:50

Panel Discussion (WINFOCUS)

How to Use Point-of-Care Ultrasound Effectively for the Management of Shock and Dyspnea

Moderators Department of Ultrasound Medicine, Saiseikai Utsunomiya Hospital Toru Kameda
Department of Emergency Medicine, Hokkaido University Hospital Kenichi Katabami

WINFOCUS-1 Introduction: POCUS framework based on ABC approach
(Introduction)

Department of Ultrasound Medicine, Saiseikai Utsunomiya Hospital Toru Kameda

WINFOCUS-2 Role of airway ultrasound in dyspnea patients

Senior Consultant Emergency Physician and ED / Critical Care in Hospital Raja Permaisuri Bainun,
Ipoh, Malaysia Adi B. Osman

WINFOCUS-3 The present and perspective of Lung POCUS for respiratory failure in Japan

Yokohama City University Medical Center Advanced Critical Care Center Hayato Taniguchi

WINFOCUS-4 "A leap from the basics to Echodynamics"

Senior Consultant Cardiac Anesthesia and Intensive Care Istituto Cardiocentro Ticino, Lugano,
SWITZERLAND Gabriele Via

WINFOCUS-5 Advanced Echocardiography

Head of Cardiac Critical Care, Heart and Lung Transplant Intensive Care and a consultant
Cardiothoracic Anesthesiologist at King Abdulaziz Medical City, Riyadh, Saudi Arabia Arif Hussain

WINFOCUS-6 Abdominal POCUS for the assessment of shock: When and what?

Critical Care Medicine, Seongnam Citizens Medical Center, Seongnam, Korea Young-Rock, Ha

WINFOCUS-7 Multiorgan Point of Care Ultrasound in suspected pulmonary embolism

Vice-director of the Emergency Department (ED), Careggi University Hospital, Firenze, Italy Peiman Nazerian

Day 3

Room 1

Room 2 (Tokyo Dome Hotel B1 Grand Ballroom TENKU (North))

8:40 ~ 9:40

Highlight Academic Session 9

	Moderators	Department of Emergency, Disaster, and Critical Care Medicine, Faculty of Medicine, Kagawa University	Yasuhiro Kuroda
		Division of Emergency and Critical Care Medicine, Department of Acute Medicine, Nihon University School of Medicine	Atsushi Sakurai
HL9-1	Feasibility study of cerebral protection by transpulmonary cooling during cardiac arrest	Division of Emergency and Critical Care Medicine, Department of Acute Medicine, Nihon University School of Medicine	Atsushi Sakurai
HL9-2	Feasibility study of transpulmonary brain cooling using porcine cardiac arrest model	Medical Technology and Material Laboratory, Research and Business Development Division, Asahi Kasei Medical Co., Ltd.	Haruka Uki
HL9-3	Soluble thrombomodulin ameliorates aberrant hemostasis after rewarming in a rat accidental hypothermia model	Hokkaido University Hospital Emergency and Critical Care Center	Shuhei Takauji
HL9-4	The Future of Cardiac Arrest and Resuscitation Science: The Utility of Biobanking and Next-Generation Sequencing	Emergency and Critical Care Medicine, Keio University School of Medicine	Tomoyoshi Tamura

9:50 ~ 11:05

Highlight Academic Session 10

	Moderators	Department of Emergency Medicine, Sapporo Medical University School of Medicine	Eichi Narimatsu
		Department of Emergency & Critical Care Medicine, Nagoya University Graduate School of Medicine	Naoyuki Matsuda
HL10-1	The function of High Density Lipoprotein in patients with sepsis	Department of Emergency and Critical Care Medicine, Graduate School of Medicine, Chiba University	Tadanaga Shimada
HL10-2	Rapidly progressive brain atrophy in septic ICU patients: A retrospective descriptive study using CT volumetry	Department of Emergency and Critical Care Medicine, Nippon Medical School Hospital	Ryuta Nakae
HL10-3	Organ Failure and Sepsis Caused by Immune Responses to Stress: Comprehensive Analyses Using Novel Techniques	Division of Acute and Critical Care Medicine, Department of Anesthesiology and Critical Care Medicine, Hokkaido University Faculty of Medicine	Takeshi Wada
HL10-4	The effects of BBB permeable Dopamine D1 receptor agonist against sepsis-induced mortality and cognitive impairment	Ehime Prefectural Central Hospital Advanced Emergency and Critical Care Center	Koichi Tanaka
HL10-5	Alert Cell Strategy: Transcriptional Regulation in Sepsis and Septic Shock from Protein Catabolism and Cell Death	Department of Emergency & Critical Care Medicine, Nagoya University Graduate School of Medicine	Naoyuki Matsuda

14:20 ~ 15:20

Highlight Academic Session 11

	Moderators	Japan Skin Bank Network Department of Emergency and Critical Care, Nagoya City University Graduate School of Medical Sciences	Hiroto Ikeda Asako Matsushima
HL11-1	IL-6/STAT3 signaling pathway inhibition for thermal burn-induced skeletal muscle atrophy	Department of Disaster and Emergency Medicine, Graduate School of Medicine, Kobe University	Yuko Ono

Day 3

Room 2

- HL11-2 Basic research for the development of REBOA catheters to enable prolonged field care in the battlefield
 Division of Traumatology, Research Institute, National Defense Medical College Nobuaki Kiriu
- HL11-3 New Heat Stroke Prevention Strategies Based on the Effects of Pituitary Adenylate Cyclase Activating Polypeptide (PACAP)
 Department of Emergency and Disaster Medicine, Showa University School of Medicine Keisuke Suzuki
- HL11-4 A Study on Stable Allograft Transport for Frozen Allogeneic Skin Grafting for Extensive Severe Burns
 Japan Skin Bank Network Hiroto Ikeda

15:30 ~ 16:30

Highlight Academic Session 12

Moderators Dept.of Emergency and Disaster Med., Gifu University Shinji Ogura
 Dept. of Traumatology and Critical Care Medicine, National Defense Medical College (NDMC), Yasumasa Sekine

- HL12-1 Basic research on artificial hibernation therapy for sepsis
 Juntendo University Urayasu Hospital Yutaka Kondo
- HL12-2 Past, Present, and Future of Foreign Body Airway Obstruction Research in the World
 University of New Mexico, School of Medicine, Department of Emergency Medicine Tatsuya Norii
- HL12-3 Web-based training using simulation software for nuclear disaster response with avatars in a virtual space
 Acute and Critical Care Center, Nagasaki University Hospital Keita Iyama
- HL12-4 Efficacy of Body Armor in Protection against Blast Injuries using a Swine Model in a Confined Space with a Blast Tube
 Dept. of Traumatology and Critical Care Medicine, National Defense Medical College (NDMC), Yasumasa Sekine

Poster (Tokyo Dome City PRISM HALL)

13:10 ~ 14:00

JAAM-EMS Asia international Poster Session

JEP-1	One-year functional outcomes after cardiopulmonary resuscitation for older adults with pre-existing long-term care needs Department of Emergency and Critical Care Medicine, Tohoku University Hospital	Hiroyuki Ohbe
JEP-2	Neurological prognosis in patients with non-traumatic out-of-hospital cardiac arrest. Department of Advanced Emergency and Critical Care Medical Center, Yamanashi Prefectural Central Hospital	Takumi Yoshino
JEP-3	Visualization of the range of applicability of extracorporeal cardiopulmonary resuscitation (ECPR) St. Luke's International Hospital	Toru Hifumi
JEP-4	ECPR: Tips and why? St. Luke's International Hospital	Toru Hifumi
JEP-5	Analysis on factors that influence delivery of bystander cardiopulmonary resuscitation Department of Emergency Medicine, IUHW Narita Hospital	So Tatebe
JEP-6	The impact of COVID-19 pandemic on pre-hospital and in-hospital treatment and outcomes of out-of-hospital cardiac arrest patients: a Japanese multicenter cohort study Department of ER and CCM, Nippon Medical School Tamanagayama Hospital	Chie Tanaka
JEP-7	Does prehospital shockable rhythm suggest cardiogenic arrest and associate with favorable outcomes? Department of Emergency and critical care medicine, Keio university hospital	Hiroaki Ogawa
JEP-8	The Neurological Outcome of Witnessed Cardiac Arrest due to VT/VF under COVID-19 Pandemic : " Has the Characteristics of ED Patients changed?" Emergency and Critical Care Medical Center Department of Emergency Medicine	Keita Kondo
JEP-9	Association between ECG patterns and outcome in patients with cardiac arrest with initial arrest rhythm of pulseless electrical activity Department of Intensive care medicine, Chiba Kaihin Municipal Hospital	Yoshihisa Tateishi
JEP-10	Estimating the Prevalence and Survival of ECPR Candidates in Out-of-Hospital Cardiac Arrest: A Nationwide Japanese Registry Study Department of Emergency Medicine, Hokkaido University Hospital	Kunihiko Maekawa
JEP-11	How did the Free-Telehealth and In-Person Consultations at Our Clinic under the COVID-19 Public Health Emergency in the Philippines Differ from Normal Medical Care? Former Japan Overseas Medical Fund stationed in Medical Clinic, The Japanese Association Manila, Inc.	Hirohisa Kikuchi
JEP-12	REBOA use in Japan over the past 18 years and its performance over time Department of Acute Critical Care Medicine, Tsuchiura Kyodo General Hospital	Hiromasa Hoshi
JEP-13	Descriptive Study of Clinical Progression in Non-severe Trauma Patients with an ISS of 15 or Less Department of Emergency Medicine, Osaka Medical and Pharmaceutical University Hospital	Tomonobu Nishii
JEP-14	About human resources exchange program resumption with the AIIMS trauma center in India Department of Traumatology and Critical Care Medicine, Osaka Metropolitan University Graduate School of Medicine	Tetsuro Nishimura
JEP-15	Proteomic Analysis in Patients with Extensive Burns: GDF-15 and Associated Pathways Department of Traumatology and Acute Critical Medicine, Osaka University Graduate School of Medicine	Shinya Onishi
JEP-16	Adverse Events during Inter-Hospital Transports on Extracorporeal Membrane Oxygenation for Covid 19 Department of Emergency Medicine and Critical Care Medicine, Tochigi Prefectural Emergency and Critical Care Center, Imperial Gift Foundation SAISEIKAI, Utsunomiya Hospital, Tochigi, JAPAN	Hiroaki Hanafusa
JEP-17	Results and tasks of extracorporeal cardiopulmonary resuscitation in Maebashi Red Cross Hospital. Advanced Medical Emergency Department & Critical Care Center, Japanese Red Cross Maebashi Hospital	Keita Kanehata

- JEP-18 Multicenter Prospective Study on the Reliability and Validity of the Japanese Version of the Family Satisfaction in the Intensive Care Unit (FS-ICU)
Department of Emergency and Critical Care Medicine, Kitasato University Satoshi Tamura
- JEP-19 Potentiality of reverse Shock Index multiplied by Glasgow Coma Scale score (rSIG) as a mortality predictor for all kind of non-cardiac-arrest patients brought by ambulance.
Department of Emergency Medicine & Critical Care, Center Hospital of the National Center for Global Health and Medicine Hiroki Yamamoto
- JEP-20 Relationship between the pain scale and the rate of emergency hospitalization and surgery in patients who visited the emergency department of a tertiary hospital complaining of abdominal pain.
Department of Emergency Medicine, Kurashiki Central Hospital Motohiro Ichikawa
- JEP-21 Usefulness of modified LEMON score in predicting difficult intubation in pediatric emergency department
Department of Emergency and Transport Medicine, National Center for Child Health and Development Shima Ohnishi
- JEP-22 Have waiting times for CT scans from the emergency department changed with the number of patients or the outbreak of the COVID19?
Department of Emergency Medicine and General Internal Medicine, Social Medical Corporation Kyouryoukai Ichinomiya nishi hospital Hirotaka Ando
- JEP-23 Questionnaire survey of media representatives attending the G7 Hiroshima Summit
Department of Traumatology and Acute Critical Medicine, Osaka University Graduate School Tomohiko Sakai
- JEP-24 Car Crash Detection System via Smartphone/Smartwatch Applications in Trauma: A Preliminary Study from Okayama City
Department of Emergency, Critical Care, and Disaster Medicine, Faculty of Medicine, Dentistry, and Pharmaceutical Sciences, Okayama University Shunki Yamamoto
- JEP-25 Remaining reluctance of the general public to perform rescue actions even immediately after completing CPR training
Department of Critical Care Nursing, Graduate School of Medicine, Kyoto University Chika Nishiyama
- JEP-26 Influence of emergency transport of Vf/VT patients during the Covid-19 epidemic
Emergency and Critical Care, Nagoya City University East Medical Center Akihiro Kato
- JEP-27 What is needed to standardize prehospital care and evaluation by paramedics? -Train the young EMTs or encourage the senior? -
Department of Emergency Medicine and Critical Care, Kansai Rosai Hospital Jumpei Takamatsu
- JEP-28 Are urban rapid response vehicles effective?
emergency department, Kansai Rosai Hospital Jinkoo Kang
- JEP-29 Significance of the first Japanese BLS class holding by Seattle fire department MEDIC II
Nippon sport Science University Graduate School of Medical and Health Science Emergency Resuscitation and Disaster Ogawa Satoo
- JEP-30 Air ambulance called to coordinated cases of bee sting in Niigata
Nagaoka Redcross Hospital Hiroyuki Tanimoto
- JEP-31 Reality and problems of rescue and ambulance transport by Kagoshima Prefecture fire and disaster management helicopter
Department of Emergency Medicine, Kagoshima City Hospital Ohira Shokei
- JEP-32 Disaster Medical Response to the Earthquake-Affected District in the Republic of Turkey: A Case Study of the JDR (Japan Disaster Relief) Medical Team Deployment
Department of Emergency & Critical Care Medicine, Juntendo University Nerima Hospital / Japan Disaster Relief Medical Team Jiro Oba
- JEP-33 Appropriate deployment and number of interpreters required for WHO EMT Type 2 operation, verified in JDR Response to Turkey-Syria earthquake.
Emergency & Critical Care Medical Center, Yokohama Rosai Hospital Tomoki Nakamori
- JEP-34 The significance of emergency physicians in disaster relief efforts: An analysis of MDS during the Turkey earthquake.
Emergency Department, Fukuoka Tokushukai Hospital Takashi Machida
- JEP-35 Naha Airport Emergency Response Plan : Training experience of tabletop drill for aircraft accidents.
Department of Emergency and Critical Care Medicine, Okinawa Redcross Hospital Hideaki Sasaki
- JEP-36 A successful case in mitigating secondary damage with emergency activation of a mechanical smoke evacuation system in a case that required CBRNE response.
Department of Emergency and Critical Care Medicine, Department of Disaster Management Division, Japanese Red Cross Medical Center Shogo Sagisaka

- JEP-37 The possibility of using ships in times of disaster: Challenges in using civilian ships
Department of Emergency & Critical Care Medicine, Tokai University School of Medicine Wataru Noguchi
- JEP-38 A Japanese Emergency Physician's Perspective on Community Practice in Bhutan
Department of Field Medicine, Graduate School of Medicine, Kyoto University, Kyoto, Japan Kiichi Hirayama
- JEP-39 Analysis of Suicide and Suicide Attempts Using the Emergency Transport Database from 2015 to 2020
Graduate school of Emergency Medical System, Kokusikan UNIV Hiroshi Takyu
- JEP-40 Study of foreign nationality cases transported by public emergency services to our hospital for five years(2018-2022).
Department of Intensive Care, Medical International Liason Center, Toranomon Hospital. Takeshi Ishii
- JEP-41 Emergency doctors can dramatically improve underserved areas of emergency medicine and play a role in connecting Asian countries and Japan.
Matsuoka Emergency Clinic Matsuoka Yoshinori
- JEP-42 As the international cooperation; Human Resource Development for Medical Simulation in the Kingdom of Cambodia
Department of Emergency and Disaster Medicine, Kyoto Prefectural University Medicine Yoshihiro Yamahata
- JEP-43 Enhancing Emergency Medicine Education for Young Physicians: A Collaborative Web-based Approach with North American Emergency Experts
Department of Traumatology and Acute Critical Medicine, Osaka University Graduate School of Medicine Shunichiro Nakao
- JEP-44 Training in Trauma Surgery at Khon Kaen Hospital, Thailand
Department of Vascular Surgery, Aichi Medical University Takayuki Kai
- JEP-45 Appropriate Targeted Temperature Management for Out-of-Hospital Cardiopulmonary Arrest Patients Resuscitated with Extracorporeal Cardiopulmonary Resuscitation: A Machine learning Cluster Analysis
Division of Emergency and Critical Care Medicine, Tohoku University Graduate School of Medicine Yuta Yokokawa
- JEP-46 Challenges Hindering Emergency Physicians' Involvement in Multicenter Collaborative Studies in Japan: A Nationwide Cross-Sectional Analysis
Department of Emergency and Critical Care Medicine, Nagoya University Graduate School of Medicine Daisuke Kasugai
- JEP-47 Epidemiology and clinical Phenotype study of Emergency Department Visits: A Multi-institutional Observational study (ECLIPSE - ED study)
TXP Medical Co. Ltd. Tadahiro Goto
- JEP-48 Handling of the Host University Hospital at the G7 Hiroshima Summit
Department of Crisis Medical Center, Emergency and Critical Care Medicine, Graduate School of Biomedical and Health Sciences, Hiroshima University Tsubasa Nishida
- JEP-49 Impact of diagnostic errors on initial diagnosis at Emergency Room in Yao Tokushukai General Hospital
Yao Tokushukai General Hospital Nobuko Matsuoka
- JEP-50 Experience of the President's Medical Support Team at the G7 Hiroshima Summit
Department of Emergency and Critical Care Medicine, Graduate School of Biomedical and Health Sciences, Hiroshima University Shinichiro Ohshimo
- JEP-51 Themes of Japanese Emergency Medicine Research: Insights from Text Analysis
Department of Emergency Medicine, National Hospital Organization Mito Medical Center / Human Health Science, Kyoto University Graduate School of Medicine Yusuke Tsutsumi
- JEP-52 Withdrawn
- JEP-53 Emergency Medicine in Space Exploration: Significance and Approaches
Department of Emergency, Disaster and Critical Care Medicine, Hyogo Medical University Keisuke Kohama

November 30 (Thu.) 8 : 30~9 : 30 Room 1 (Tokyo Dome City Theatre G-ROSSO)

SL5 Modern Management of Acute Atrial Fibrillation

Ian G. Stiell

Distinguished Professor, University of Ottawa, and Senior Scientist of the Clinical Epidemiology Program,
Ottawa Hospital Research Institute, Canada

C.V.

Dr. Ian Stiell is Professor, Department of Emergency Medicine, University of Ottawa, Distinguished Professor, University of Ottawa, and Senior Scientist of the Clinical Epidemiology Program, Ottawa Hospital Research Institute. He leads a productive team of Emergency Medicine researchers and chairs an Internationally recognized Emergency Medicine Research Fellowship. He presently holds and has held millions of dollars of peer-reviewed funding and has published 468 peer-reviewed papers including 30 in very high impact journals. His major research initiatives have been in two main areas within the field of emergency health services: a) development of clinical decision rules, and b) resuscitation clinical trials. He developed the Ottawa Ankle Rules and Canadian C-Spine Rule and was the Principal Investigator for the landmark OPALS Studies for prehospital care. His current research interests include acute atrial fibrillation and acute heart failure. Dr. Stiell was appointed Editor-in-Chief of the Canadian Journal of Emergency Medicine in 2018.

The presenter will cover the following objectives for the audience:

1. Be familiar with recent evidence and guidelines for management of Acute AF/AFL
2. Understand the details of aggressive management of acute AF/AFL
3. Understand best practices for stroke prevention and disposition

SL6 Management of sepsis induced coagulopathy

Julie Helms

Intensive Care Unit (MIR-NHC), Strasbourg University Hospital, France

C.V.

Professor in Critical Care

Intensive Care Unit (MIR-NHC), Strasbourg University Hospital, France

Diplomas and certificates

- Medicine Doctor (MD), 2013
- Anesthesiology and Intensive Care specialization, 2014
- Critical Care specialization, 2015
- PhD, Strasbourg University (2014)
- *Habilitation à Diriger des Recherches* (HDR), Strasbourg University (2017)

Responsibilities:

- Associate Editor for *Intensive Care Medicine* (impact factor 41.8)
- Associate Editor for *Annals of Intensive Care* (impact factor 10.3)

- French Intensive Care Society (FICS/SRLF):
 - General secretary (2023-2025)
 - Representative at the Global Sepsis Alliance

- European Society of Intensive Care Medicine (ESICM):
 - French representative of the society
 - Mentor for the research learning course

- International Society of Thrombosis and Haemostasis (ISTH): member of a subcommittee Perioperative and Critical Care

- CRICS-TRIGGERSEP network: leader of the scientific board

- European Society of Anaesthesiology and Intensive Care (ESAIC): member of the expert group for thromboprophylaxis recommendations

- Strasbourg University Hospital: vice-president of the scientific board.

In the context of thrombotic coagulopathy with an excessive thrombin generation like in sepsis-associated coagulopathy (SAC), anticoagulation may prevent or reverse excessive coagulation activation and immunothrombosis dysregulation. However, to date, no anticoagulant treatment has proven its efficacy in SAC.

The international randomized controlled SCARLET study, comparing the effect of recombinant human thrombomodulin (rhTM) with placebo, is the first study of this scale to only include patients with sepsis and coagulopathy. Although no significant reduction in day 28 mortality was observed in the full analysis set, rhTM was more effective in subgroups of patients with persistent coagulopathy at the time of administration of the 1st dose of treatment and those who did not receive concomitant treatment with heparin in the context of thromboprophylaxis. These results were confirmed in a post-hoc analysis carried out on the cohort of French patients. rhTM thus remains a potentially promising treatment for DIC induced by septic shock.

The lack of patient stratification for administering anticoagulant treatment is responsible for some failures of large clinical trials. For example, in some post-hoc analyses of randomized clinical trials, the least severe patients do not benefit from treatment with heparin, antithrombin, activated protein C, or rhTM, as they do not have coagulopathy. Indeed, treatment with physiological coagulation inhibitors in septic shock could only benefit patients in the severe (disseminated intravascular coagulation) condition, since local immunothrombosis can participate in physiological immune defense responses.

In septic coagulopathy, anticoagulant treatments are administered to alter the delicate balance between the pathogen and the adaptive host response. While the activation of adaptive coagulation is an essential part of the host defense mechanism (immunothrombosis), its dysregulated and excessive activation is deleterious. It is, therefore, necessary to distinguish between patients in sepsis or septic shock, depending on whether the state of activation of coagulation is deemed harmful (excessive) or beneficial (controlled), which might be considered as “adaptive hemostasis” ; the former could benefit from anticoagulant treatment, while the latter would not.

November 30 (Thu.) 14 : 10~15 : 00 Room 1 (Tokyo Dome City Theatre G-ROSSO)

SL7 Role of the Medical Director in EMS

Peter J. Kudenchuk

Professor of Medicine/Cardiology, University of Washington, Department of Medicine, Division of Cardiology, USA

C.V.

Dr. Kudenchuk is Professor of Medicine and Cardiology at the University of Washington in Seattle, WA, and Medical Program Director for King County Medic One. He is a cardiac electrophysiologist who serves on the Advanced Life Support (ALS) Task Force for the International Liaison Committee on Resuscitation (ILCOR), the American Heart Association (AHA) National Guidelines Writing Group and on the Advisory Boards of the Resuscitation Academy and Global Resuscitation Alliance.

The lecture will describe the critical steps that lead to effective direction of emergency medical services (EMS). Seattle/King County EMS will be used to illustrate important principles and practices – including setting proper priorities, building relationships, accountability and others that can serve as the foundation for a culture of excellence.

PL2 Reverse Shock Index multiplied by Glasgow Coma Scale score (rSIG) as a point-of-care severity assessment for initial management of emergency patients

Akio Kimura

Director of Department of Emergency Medicine and Intensive Care Unit
Center Hospital of the National Center for Global Health and Medicine, Tokyo, Japan

C.V.

Present position and professional qualification

Director, Department of Emergency Medicine & Intensive Care Unit
Center Hospital of the National Center for Global Health and Medicine
Emergency and Critical Care physician (JAAM), Trauma expert (JAST)

Degrees & Academic background:

Mar. 1984: Graduated from Gifu University, School of Medicine
May 1984: Obtained the M.D. degree
Dec. 1992: Obtained the Ph.D. degree in Medical Science
Apr. 2005~2022: Granted the guest Professor of Gifu University, School of Medicine
Apr. 2006~: Granted the guest Professor of Tokyo Medical and Dental University, School of Medicine
Apr 2014~: Professor of the postgraduate school of Juntendo University, School of Medicine

Employment Record:

<u>Name of Employers</u>	<u>Period</u>	<u>Post Held</u>
Nippon Medical School	Jun.1984 – Jun. 1987	Resident, Department of Emergency & Critical Care Medicine
	Jul. 1987 – Mar. 1996	Attending Staff, Department of Emergency & Critical Care Medicine
	Apr. 1996 – Sep. 1997	Assistant Professor, Department of Emergency & Critical Care Medicine
International Medical Center of Japan	Oct. 1997 – Sep. 2000	Chief for outpatients, Department of Emergency Medicine, Traumatology & Toxicology
	Sep. 2000 – Mar. 2010	Director, Department of Emergency Medicine, Traumatology & Toxicology
Center Hospital of the National Center for Global Health and Medicine (the renamed hospital above)	Apr. 2010 – present	Director, Department of Emergency Medicine & Critical Care (the renamed department above)
	Jan.2015 – present	Director, Intensive Care Unit

To improve the international quality of emergency medicine including trauma care, there is a need for a simple and reliable severity assessment tool that can be used under any circumstances in low- and middle-income countries as well as high-income countries. On the other hand, many of previous severity assessment tools are complex, and not suitable for real-time use in clinical practice. We have found that a simple calculation, the Reverse Shock Index (systolic blood pressure divided by heart rate) multiplied by Glasgow Coma Scale score (rSIG) on arrival at the hospital revealed to be a very promising predictor of in-hospital mortality in trauma patients (Crit Care. 2018;22:87). It was subsequently validated in the United States, Germany, South Korea, Taiwan, and other countries. Recently, we analyzed data from the revamped Japan Trauma Data Bank and proved that it is superior not only in predicting in-hospital mortality but also in identifying severe trauma patients who require advanced resuscitations, surgical interventions, and massive blood transfusions. Furthermore, in septic patients, rSIG showed better discriminative ability for mortality and needs for resuscitative procedures. We hope that it will be validated and utilized as a point-of-care severity assessment not only for trauma care but also other emergency medical practice in more and more countries.

November 28 (Tue.) 10 : 30~11 : 45 Room 2 (Tokyo Dome Hotel B1 Grand Ballroom TENKU (North))

HL1-1 Hour-1 bundle adherence was associated with reduction of in-hospital mortality among patients with sepsis in Japan

Yutaka Umemura

Osaka General Medical Center

Background

The updated Surviving Sepsis Campaign guidelines recommend a 1-hour window for completion of a sepsis care bundle; however, the effectiveness of the hour-1 bundle has not been fully evaluated. The present study aimed to evaluate the impact of hour-1 bundle completion on clinical outcomes in sepsis patients.

Methods

This was a multicenter, prospective, observational study conducted in 17 intensive care units in tertiary hospitals in Japan. We included all adult patients who were diagnosed as having sepsis by Sepsis-3 and admitted to intensive care units from July 2019 to August 2020. Impacts of hour-1 bundle adherence and delay of adherence on risk-adjusted in-hospital mortality were estimated by multivariable logistic regression analyses.

Results

The final study cohort included 178 patients with sepsis. Among them, 89 received bundle adherent care. Completion rates of each component (measure lactate level, obtain blood cultures, administer broad-spectrum antibiotics, administer crystalloid, apply vasopressors) within 1 hour were 98.9%, 86.2%, 51.1%, 94.9%, and 69.1%, respectively. Completion rate of all components within 1 hour was 50%. In-hospital mortality was 18.0% in the patients with and 30.3% in the patients without bundle-adherent care ($p = 0.054$). The adjusted odds ratio of non-bundle-adherent versus bundle-adherent care for in-hospital mortality was 2.32 (95% CI 1.09–4.95) using propensity scoring. Non-adherence to obtaining blood cultures and administering broad-spectrum antibiotics within 1 hour was related to in-hospital mortality (2.65 [95% CI 1.25–5.62] and 4.81 [95% CI 1.38–16.72], respectively). The adjusted odds ratio for 1-hour delay in achieving hour-1 bundle components for in-hospital mortality was 1.28 (95% CI 1.04–1.57) by logistic regression analysis.

Conclusion

Completion of the hour-1 bundle was associated with lower in-hospital mortality. Obtaining blood cultures and administering antibiotics within 1 hour may have been the components most contributing to decreased in-hospital mortality.

HL1-2 Association between low body mass index and increased 28-day mortality of severe sepsis in Japanese cohorts

Takehiko Oami

Department of Emergency and Critical Care Medicine, Chiba University Graduate School of Medicine

Background:

Current research regarding the association between body mass index (BMI) and altered clinical outcomes of sepsis in Asian populations is insufficient. The aim of this study was to examine if patients with a lower BMI have worse clinical outcomes using large Japanese cohorts of severe sepsis.

Methods:

We investigated the association between BMI and clinical outcomes using two Japanese cohorts of severe sepsis (derivation cohort, Chiba University Hospital, n = 614; validation cohort, multicenter cohort, n = 1561). Participants were categorized into the underweight (BMI < 18.5) and non-underweight (BMI ≥ 18.5) groups. The primary outcome was 28-day mortality. Multivariate logistic regression was used to analyze the impact of BMI category on 28-day mortality.

Results:

Univariate analysis of the derivation cohort indicated increased 28-day mortality trend in the underweight group compared to the non-underweight group (underweight 24.4% [20/82 cases] vs. non - underweight 16.0% [85/532 cases]; p = 0.060). In the primary analysis, multivariate analysis adjusted for baseline imbalance revealed that patients in the underweight group had a significantly increased 28-day mortality compared to those in the non-underweight group (p = 0.031, adjusted odds ratio [OR] 1.91, 95% confidence interval [CI] 1.06-3.46). In a repeated analysis using a multicenter validation cohort (underweight n = 343, non-underweight n = 1218), patients in the underweight group had a significantly increased 28-day mortality compared to those in the non-underweight group (p = 0.045, OR 1.40, 95% CI 1.00-1.97).

Conclusions:

Patients with a BMI < 18.5 had a significantly increased 28-day mortality compared to those with a BMI ≥ 18.5 in Japanese cohorts with severe sepsis. This study was published in the peer-reviewed journal: Oami T, Karasawa S, Shimada T, Nakada TA, Abe T, Ogura H, et al; JAAM FORECAST Group. Association between low body mass index and increased 28-day mortality of severe sepsis in Japanese cohorts. *Sci Rep.* 2021;11(1):1615.

November 28 (Tue.) 10 : 30~11 : 45 Room 2 (Tokyo Dome Hotel B1 Grand Ballroom TENKU (North))

HL1-3 Characteristics, management, and in-hospital mortality among patients with sepsis in Japan

Toshikazu Abe

Tsukuba Memorial Hospital / University of Tsukuba

Background: As sepsis is a leading cause of death and long-term disability in developed countries, this study aimed to investigate the characteristics, management, and outcomes of patients with sepsis in Japan.

Methods: Multicenter observational studies for sepsis in Japan since 2016 were summarized. The FORECAST study conducted in 59 ICUs in 2016 included patients with sepsis-2. The SPICE study conducted in 37 ERs or 22 ICUs in 2017 included patients with suspected infections, and MAESTRO study from 17 ICUs in 2019 included patients with sepsis-3.

Results: A total of 1,184, 1,060, 652, and 178 cases were involved in the FORECAST, SPICE-ER, SPICE-ICU, and MAESTRO studies, respectively. Hereafter, the same order has been followed. The median age was 73, 78, 72, and 75 years. Diabetes mellitus was the most common comorbidity in all registries. Of the patients, 63%, 12%, 42%, and 56% exhibited shock and the most common infection sites in all registries were the lungs. The median length of hospital stay was 24, 14, 23, and 20 days while the proportion of patients for home discharges were 37%, 60%, 31%, and 33%.

In the FORECAST study, the compliance rate for the entire 3-h bundle (blood culture: 92%, broad-spectrum antimicrobial: 84%) was 64%. However, in the MAESTRO study, the compliance rate for the entire Hour-1 bundle (blood culture: 86%, broad-spectrum antimicrobial: 51%) was 50%. Although, no association was observed between the compliance rates for the entire 3-h bundle and lower in-hospital mortality, the association was observed with the Hour-1 bundles using multivariable analyses. In Hour-1 bundles, obtaining the blood culture and initiating broad-spectrum antimicrobial therapy were associated to lower in-hospital mortality.

Conclusion: Although the population of the sepsis registries has changed along with the definition of sepsis, the basic characteristics of sepsis have no significant change. The in-hospital mortality rate for sepsis remains high. Since compliance with the bundles likely reduces the mortality, further improvement in the quality of sepsis care is warranted.

HL1-4 rSIG as a simple and rapid assessment tool in initial sepsis management: multicenter comparisons with MEWS

Wataru Matsuda

Center Hospital of National Center for Global Health and Medicine

[Introduction] Early warning scores (EWS), such as Modified early warning score (EWS), are used to screen for sepsis. However, EWS require the collection of a lot of information, therefore, these make it difficult to indicate in low-resource settings. For a more generalizable screening, we noticed on the reverse shock index multiplied by Glasgow coma scale (GCS) score (rSIG, = GCS x SBP/HR), which is simple and predictive tool for trauma patients.

[Methods] This study is a post-hoc analysis of a multicenter observational study conducted by Japanese Association for Acute Medicine. We analyzed two cohorts from patients with suspected infections admitted from the emergency department (cohort 1) and patients with suspected infections admitted to the ICU from outside the ICU (cohort 2). Primary endpoint was 28-day death. Secondary endpoints were 28-day survival without ICU admission (cohort 1) and need for invasive organ support therapies at acute phase (vasopressor use, received mechanical ventilation or death until day 4) (cohort 2). We compared the area under the receiver-operating characteristic (AUROC) curve of the rSIG and MEWS for each outcome.

[Results] 910 (cohort 1) and 573 (cohort 2) patients were analyzed. In Cohort 1, the AUROC for 28-day death of rSIG was significantly higher than that of MEWS (0.69 [0.64-0.75] vs 0.64 [0.59-0.70], $p=0.02$). The cut-off values when the AUROC of each score was maximum were 13.6 and 5, respectively. In Cohort 2, the AUROC for 28-day death of rSIG was higher than that of MEWS, but the difference was not significant (0.62 [0.56-0.68] vs 0.58 [0.52-0.65], $p=0.10$). In secondary outcomes, the AUROCs for 28-day survival without ICU admission was similar between rSIG and MEWS (0.68 [0.65-0.72] vs 0.67 [0.63-0.70], $p = 0.31$). On the other hand, the AUROC for need for invasive organ support therapies at acute phase of rSIG was significantly higher than with that of MEWS (0.71 [0.66-0.77] vs 0.65 [0.60-0.71], $p=0.006$).

[Conclusions] This study showed that rSIG was superior to MEWS in predicting short-term outcomes in patients with suspected infection.

November 28 (Tue.) 10 : 30~11 : 45 Room 2 (Tokyo Dome Hotel B1 Grand Ballroom TENKU (North))

HL1-5 Impact of Body Temperature Abnormalities on the Implementation of Sepsis Bundles and Outcomes in Patients With Sepsis

Shigeki Kushimoto

Division of Emergency and Critical Care Medicine, Tohoku University Graduate School of Medicine

Objectives: To investigate the impact of body temperature on disease severity, implementation of sepsis bundles, and outcomes in sepsis patients.

Design: Retrospective sub-analysis.

Setting: 59 ICUs in Japan, from January 2016 to March 2017.

Patients: Adult patients with sepsis were enrolled and divided into three categories (body temperature < 36°C, 36-38°C, > 38°C), using the core body temperature at admission.

Measurements and main results: Compliance with the bundles proposed in the Surviving Sepsis Campaign Guidelines 2012, in-hospital mortality, and the number of ICU and ventilator-free days were evaluated. Of 1,143 enrolled patients, 127, 565, and 451 were categorized as having body temperature less than 36°C, 36-38°C, and greater than 38°C, respectively. Hypothermia-body temperature less than 36°C-was observed in 11.1% of patients. Patients with hypothermia were significantly older than those with a body temperature of 36-38°C or greater than 38°C and had a lower body mass index and higher prevalence of septic shock than those with body temperature greater than 38°C. APACHE II and Sequential Organ Failure Assessment scores on the day of enrollment were also significantly higher in hypothermia patients. Implementation rates of the entire 3-hour bundle and administration of broad-spectrum antibiotics significantly differed across categories; implementation rates were significantly lower in patients with body temperature less than 36°C than in those with body temperature greater than 38°C. Implementation rate of the entire 3-hour resuscitation bundle + vasopressor use + remeasured lactate significantly differed across categories, as did the in-hospital and 28-day mortality. The odds ratio for in-hospital mortality relative to the reference range of body temperature greater than 38°C was 1.760 (95% CI, 1.134-2.732) in the group with hypothermia. The proportions of ICU-free and ventilator-free days also significantly differed between categories and were significantly smaller in patients with hypothermia.

Conclusions: Hypothermia was associated with a significantly higher disease severity, mortality risk, and lower implementation of sepsis bundles.

HL2-1 End-of-Life Care in Out-of-Hospital Cardiac Arrest Patients: Multicenter Collaborative Study

Norihiro Nishioka

Department of Preventive Services, Kyoto University Graduate School of Medicine

[Background]

Out-of-hospital cardiac arrest (OHCA) poses an imminent risk of death within a very short timeframe, making it difficult to establish treatment plans with patients and their families. However, the clear path for making choices that align with the patient's wishes remains undefined. Withholding aggressive treatments due to poor prognosis is a complex and challenging decision, necessitating crucial decision-making support and information provision to patients and families. Unfortunately, information supporting treatment withholding for deteriorating or end-of-life OHCA patients is insufficient.

[Objective]

This study aims to investigate the current status of withholding acute-phase treatments after OHCA in Japan and examine the influencing factors. The goal is to contribute to the development of treatment strategies, establishment of treatment protocols, and support for treatment choices based on patients' and families' wishes in post-OHCA end-of-life care.

[Methods]

In this study, a multicenter prospective cohort research (CRITICAL study) involving 14 emergency departments in Osaka Prefecture was expanded, and additional participating facilities were recruited to commence information collection regarding treatment withholding in OHCA patients. We further accumulated case data from pre-hospital records and in-hospital medical records, and initiated information collection on end-of-life care this fiscal year (2023). Specific data collected included the timing of chest compression cessation and the duration of in-hospital treatments, along with the reasons for discontinuation in cases of death. We also recorded the implementation status of brain death determination.

[Prospects]

This study serves as a database of clinical information related to withholding acute-phase treatments after OHCA, enabling an understanding of the current situation and identification of challenges. By examining factors influencing treatment withholding, it can contribute to supporting optimal treatment decision-making for patients and their families. The presentation will discuss the accumulated data and future prospects.

HL2-2 ECPR in adult patients with OHCA: a retrospective large cohort multicenter study in Japan

Akihiko Inoue

Hyogo Emergency Medical Center

BACKGROUND: The prevalence of extracorporeal cardiopulmonary resuscitation (ECPR) in patients with out-of-hospital cardiac arrest (OHCA) has been rapidly increasing worldwide. However, real-world data on ECPR, such as indication, management, and complications of ECPR have not been thoroughly evaluated.

Our group designed the multicenter retrospective large cohort study in Japan known as the SAVE-J II study to provide real-world data on ECPR, including details data of complications and management of ECPR. In the SAVE-J II study, 36 hospitals participated, which included 2,157 adult out-of-hospital cardiac arrest patients who underwent ECPR between 2013 and 2018.

The purpose of the main analysis is to evaluate patient characteristics, outcomes, and complications with large cohort of ECPR for OHCA patients (this study was published in *Critical care* 2022 May 9;26(1):129.)

METHODS: We selected patients from SAVE-J II who were presumed cardiac etiology. The primary outcome was favorable neurological outcome at hospital discharge, defined as a cerebral performance category of 1 or 2.

RESULTS: A total of 1,644 patients with OHCA were included in this study. The patient age was 18–93 years (median: 60 years). The median estimated low flow time was 55 minutes (interquartile range: 45–66 minutes). Favorable neurological outcome at hospital discharge was observed in 14.1% of patients, and the rate of survival to hospital discharge was 27.2%. The proportions of favorable neurological outcome at hospital discharge in terms of shockable rhythm, pulseless electrical activity, and asystole were 16.7%, 9.2%, and 3.9%, respectively. Complications were observed during ECPR in 32.7% of patients, and the most common complication was bleeding, with the rates of cannulation site bleeding and other types of hemorrhage at 16.4% and 8.5%, respectively.

CONCLUSIONS: In this large cohort, data on the ECPR of 1,644 patients with OHCA show that the proportion of favorable neurological outcomes at hospital discharge was 14.1%, survival rate at hospital discharge was 27.2%, and complications were observed during ECPR in 32.7% of patients.

HL2-3 Private residence as a location of cardiac arrest may have a deleterious effect on the outcomes of non-shockable OHCA

Keita Shibahashi

Tertiary Emergency Medical Center, Tokyo Metropolitan Bokutoh Hospital

Aim: We compared the outcomes between patients who experienced out-of-hospital cardiac arrest at private residences and public locations to investigate whether patient and bystander characteristics can explain the poorer outcomes of out-of-hospital cardiac arrests at private residences.

Methods: Adult patients with intrinsic out-of-hospital cardiac arrest (n=6,191, age ≥ 18 years) were selected from a prospectively collected Japanese database (January 2012 and March 2013). Patients were grouped according to arrest location into private-residence or control (e.g., public station or road, workplace, school, and other public locations) groups. The primary outcome was a favourable neurological outcome 1 month after out-of-hospital cardiac arrest.

Results: The arrest location and initial cardiac rhythm had interaction effects on the outcome. After adjusting for patient and bystander characteristics and relative to the control group, a significantly poorer 1-month neurological outcome was observed in the private-residence group if the initial cardiac rhythm was non-shockable (odds ratio: 0.36, 95% confidence interval: 0.24 to 0.54), while it was not significant if the initial cardiac rhythm was shockable (odds ratio: 1.16, 95% confidence interval: 0.74 to 1.84).

Conclusions: Patients with out-of-hospital cardiac arrest at private residences had poorer outcomes than those with out-of-hospital cardiac arrest at public locations, even after adjusting for patient and bystander characteristics, if the initial cardiac rhythm was non-shockable. Our results suggest that poorer patient and bystander characteristics do not completely explain the poorer outcomes of out-of-hospital cardiac arrests; there may be unknown mechanisms through which the location of cardiac arrest affect the outcomes.

November 28 (Tue.) 13 : 40~14 : 40 Room 2 (Tokyo Dome Hotel B1 Grand Ballroom TENKU (North))

HL2-4 Prediction Model Developed Using Deep Learning For Termination Of Resuscitation in Out - of Hospital Cardiac Arrest

Kentaro Kajino

Department of Emergency and Critical Care Medicine, Kansai Medical University

Background: Correct identification of futile prehospital resuscitation efforts for out-of-hospital cardiac arrest (OHCA) may reduce unnecessary transport. Reliable prediction variables for OHCA 'termination of resuscitation' (TOR) rules are needed to guide treatment decisions. The Universal TOR rule, which uses only three variables, is a validated prediction scoring system. The development of decision rules requires a large sample size as well as time-consuming statistical analysis. Deep learning (DL), an artificial intelligence (AI) platform is an attractive model to guide TOR for OHCA. We developed a prediction model using AI and DL software, Prediction One (Sony Network Communications Inc., Tokyo, Japan). and compared its performance to the Universal TOR following OHCA in Japan

Methods: A retrospective, population-based review of presumed cardiac origin OHCA patients without prehospital ROSC from January 1, 2010 to December 31, 2017 in the All-Japan Utstein Registry. We divided the dataset into 2 parts, the first half (2010-2014) was used as a training dataset and second half (2015-2017) for external validation. Prediction One created the model using the training dataset with internal cross-validation. We then tested both the created model and Universal TOR rule to predict outcomes using the external validation set and compared area under the curve (AUC)

Results: There were 989,929 OHCA cases, 18 years of age or older, registered in the All-Japan Utstein Registry and 575,346 cases were of presumed cardiac origin. Of these, 354,356 cases were used for the training dataset and 220,990 cases for the external validation dataset. The model developed by Prediction One using 11 variables had AUC of 0.969, and its AUC for the validation dataset was 0.964 (95%CI 0.963–0.966). The AUC calculated using the Universal TOR rule was 0.948, and its AUC for the validation dataset was 0.939 (95%CI 0.936 –0.942).

Conclusions:

The accuracy of prediction models using Prediction One to determine outcomes in OHCA was excellent and slightly better than the Universal TOR rule. Further research into the utility of using AI platforms for TOR prediction is needed.

HL3-1 Multicenter chest CT registry for patients with severe ARDS requiring V-V ECMO in Japan: J-CARVE registry

Mitsuaki Nishikimi

Department of Emergency and Critical Care Medicine, Graduate School of Biomedical and Health Sciences, Hiroshima University

Acute respiratory distress syndrome (ARDS) is a heterogeneous syndrome, and the characteristics of “bilateral opacities in lungs” , based on the Berlin definition of ARDS, are different in each individual patient. Although the findings on chest CT are helpful for understanding the pathophysiology of severe ARDS requiring veno-venous extracorporeal membrane oxygenation (V-V ECMO), there was no large multicenter registry including chest CT data. The aim of this study was to describe the design of our large multicenter registry across Japan for severe ARDS patients with V-V ECMO including the interpretation for chest CT imaging, J-CARVE registry.

A total of twenty-three Intensive Care Units (ICUs) in Japan participated in this registry. The patients with severe ARDS who were initiated on V-V ECMO support between January 2012 and December 2022 were included. The J-CARVE registry mainly collected the data of patients from the first day of starting V-V ECMO until 2 days after ECMO liberation. It included the data of basic demographics and comorbidities, laboratory tests , setting and measured values of mechanical ventilation, treatment, outcome and anonymized chest CT at the start of ECMO support. Participating hospitals are limited to those who have an experience of ECMO management >10 patients ever. As a result, 688 patients including 642 chest CT data were registered.

Our registry is the first large sample size registry including the the characteristics of chest CT findings for severe ARDS patients in the world. We expect that our database can provide many important clinical findings, which had not been discovered yet in this research field.

November 28 (Tue.) 14 : 40~15 : 40 Room 2 (Tokyo Dome Hotel B1 Grand Ballroom TENKU (North))

HL3-2 BEst National Estate for Disseminated Intravascular Coagulation Thesis (BENEDICT) Database

Katsunori Mochizuki

Department of Emergency and Critical Care Medicine, Osaka Medical and Pharmaceutical University

Severe conditions in the critical care field, such as sepsis, often complicate disseminated intravascular coagulation (DIC), resulting in unfavorable outcomes. Due to the lack of established treatment methods for DIC, the evaluation of coagulation parameters is not emphasized in overseas settings. On the other hand, in Japan, anti-DIC agents are widely used in daily clinical practice, and coagulation parameters are regularly assessed. Therefore, it is important to analyze detailed real-world clinical data from Japan to establish DIC treatment methods. However, in the large-scale registries conducted manually thus far, it has been challenging to analyze detailed coagulation parameters, patient conditions, as well as the sequence and timing of therapeutic interventions. Consequently, our country has lacked a large-scale database capable of such detailed analysis.

To address this issue, we believe that automatic collection of clinical data is essential for constructing a large-scale database that includes detailed time-series information. Therefore, we have utilized the NEXT Stage system developed by TXP Medical Co. to automatically collect detailed clinical data across multiple centers. At the time of writing this abstract, the automatic data collection system has been implemented in our center, and the process of adapting the system to the environments of seven participating centers, including three university hospitals, has commenced.

This study, utilizing the automatic data collection system, aims to create a multi-center integrated database: the BEst National Estate for Disseminated Intravascular Coagulation Thesis (BENEDICT) Database, which includes detailed time-series data from electronic medical records, intensive care department systems, and Diagnosis Procedure Combination (DPC) data of the participating centers. The database will be used for a multi-center observational study to evaluate the epidemiology, diagnosis, pathophysiology, and treatment of DIC.

In this presentation, we will provide an overview of the BENEDICT Database project, its current status, and discuss future directions.

HL3-3 Prehospital stroke prediction algorithm for diagnosis and surgical intervention using machine learning

Yosuke Hayashi

Department of Emergency and Critical Care Medicine, Chiba University Graduate School of Medicine

[Introduction] Early initiation of therapeutic approaches is key to improving patient outcomes with stroke. It is challenging for emergency medical services (EMS) personnel to triage patients with stroke immediately and accurately, lots of prehospital stroke prediction scales have been developed to help them. However, there is still room for improvement in prediction accuracy. We developed a machine learning-based algorithm to predict prehospital stroke diagnosis and surgical intervention to improve the quality of stroke care and outcomes. [Methods] These multicenter observational studies were prospectively conducted on adult patients who were suspected of stroke by EMS personnel and transported to 12 medical institutions in Chiba City. For the prediction of stroke and stroke subcategories (acute ischemic stroke [AIS] with/without large vessel occlusion [LVO], intracranial hemorrhage [ICH], and subarachnoid hemorrhage [SAH]), the 1446 patients with suspected stroke were analyzed and randomly assigned training cohort (1156 patients) and test cohort (290 patients). For the prediction of requiring surgical intervention (clipping or coiling for SAH, hematoma removal or drainage for ICH, t-PA or endovascular therapy for AIS), the 1143 patients with suspected stroke were analyzed and randomly assigned training cohort (765 patients) and test cohort (378 patients). We tested logistic regression, random forest, support vector machine, eXtreme Gradient Boosting (XGBoost) as machine learning models. [Results] In the diagnostic algorithms for stroke, using XGBoost had the highest predictive value with an area under the receiver operating curve (AUROC) of 0.980 in the test cohort. In the diagnostic algorithms for subcategories, using XGBoost also had a high predictive value that AUROC in the test cohort was 0.898 /0.882 for AIS with/without LVO, 0.866 for ICH, and 0.926 for SAH, respectively. In the prediction of requiring surgical intervention, the prediction algorithm using XGBoost had high accuracy in the test cohort with AUROC 0.802. [Conclusion] The prehospital prediction algorithm using machine learning had high predictive value for stroke diagnosis and surgical intervention.

November 28 (Tue.) 14 : 40~15 : 40 Room 2 (Tokyo Dome Hotel B1 Grand Ballroom TENKU (North))

HL3-4 Trends in survival during the pandemic in patients with critical COVID-19 receiving mechanical ventilation and ECMO

Shinichiro Ohshimo

Non-profit organization Japan ECMO Network, Tokyo, Japan

Background: This study aimed to evaluate changes in survival over time and the prognostic factors in critical coronavirus disease 2019 (COVID-19) patients receiving mechanical ventilation with/without extracorporeal membrane oxygenation (ECMO) using the largest database in Japan.

Methods: This is a prospective observational cohort study of patients admitted to intensive care units in Japan with fatal COVID-19 pneumonia receiving mechanical ventilation and/or ECMO. We developed a prospective nationwide registry covering > 80% of intensive care units in Japan, and analyzed the association between patients' backgrounds, institutional ECMO experience, and timing of treatment initiation and prognosis between February 2020 and November 2021. Prognostic factors were evaluated by Kaplan-Meier analysis and Cox proportional hazards analysis.

Results: A total of 9418 patients were ventilated, of whom 1214 (13%) received ECMO. The overall survival rate for ventilated patients was 79%, 65% for those receiving ECMO. There have been five outbreaks in Japan to date. The survival rate of ventilated patients increased from 76% in the first outbreak to 84% in the fifth outbreak ($p < 0.001$). The survival rate of ECMO patients remained unchanged at 60-68% from the first to fifth outbreaks ($p = 0.084$). Age of ≥ 59 (hazard ratio [HR] 2.17; 95% confidence interval [CI] 1.76-2.68), ventilator days of ≥ 3 before starting ECMO (HR 1.91; 95% CI 1.57-2.32), and institutional ECMO experiences of ≥ 11 (HR 0.70; 95% CI 0.58-0.85) were independent prognostic factors for ECMO.

Conclusions: During five COVID-19 outbreaks in Japan, the survival rate of ventilated patients tended to have gradually improved, and that of ECMO patients did not deteriorate. Older age, longer ventilator days before starting ECMO, and fewer institutional ECMO experiences may be independent prognostic factors for critical COVID-19 patients receiving ECMO (Ohshimo S, et al. Crit Care 2022;26:354).

HL4-1 Reverse Shock Index multiplied by Glasgow Coma Scale score as a point-of-care severity assessment for trauma management

Tatsuki Uemura

Department of Emergency Medicine and Critical Care, Center Hospital of the National Center for Global Health and Medicine

Background: Severe trauma patients often require emergent interventions such as massive transfusion, resuscitative procedures, surgical procedures and consume considerable human and medical resources. However, very few practical indices can be easily used for emergent interventions. In recent years, it has become clear that the rSIG value (Reverse Shock Index multiplied by Glasgow Coma Scale (GCS) score), which can be easily calculated from vital signs, is extremely promising as predictor of mortality. However, it is unclear whether rSIG is useful for emergent interventions.

Methods: Data collected by the Japan Trauma Data Bank for adult patients admitted directly from the scene of trauma between April 2019 and December 2020 were analysed. The outcomes were massive transfusion (MT), resuscitative procedures (RP), surgical procedures (SP) and emergent interventions (EI). EI were defined as the composite outcome of requiring MT, RP and SP. The ability of rSIG to predict MT was compared with that of ABC score and FASILA score by receiver operating characteristic curve analysis. The ability of rSIG to predict RP and SP was compared with that of Shock Index (SI), GCS, Triage Revised Trauma score (T-RTS) and Previous Simple Prediction (PSP) score. The ability of rSIG to predict EI was compared with that of T-RTS, PSP, ABC and FASILA.

Results: The study included 32,201 patients, 6,371 of whom required EI. The area under the receiver operating characteristic curve (AUROC) for massive transfusion was highest for rSIG (0.846 [95% confidence interval 0.832–0.859]) and were significantly higher than those for ABC and FASILA. AUROCs for RP and SP were highest for rSIG (0.777 [0.769–0.785], and 0.731 [0.720–0.741], respectively) and were significantly higher than those for SI, GCS, T-RTS and PSP. The AUROC for EI was highest for rSIG (AUROC 0.760 [0.753–0.768]) and was significantly higher than those for T-RTS, PSP, ABC and FASILA. The optimal cut-off value of rSIG for predicting EI was 14.6.

Conclusions: rSIG is a simple and effective predictor for emergent interventions as a point-of-care severity assessment for initial trauma management.

November 28 (Tue.) 15 : 45~17 : 00 Room 2 (Tokyo Dome Hotel B1 Grand Ballroom TENKU (North))

HL4-2 Early prediction models for new-onset functional impairment at hospital discharge of ICU admission

Hiroyuki Ohbe

Department of Clinical Epidemiology and Health Economics, School of Public Health, The University of Tokyo

Purpose: We aimed to develop and validate models for predicting new-onset functional impairment after intensive care unit (ICU) admission with predictors routinely collected within two days of ICU admission.

Methods: In this multi-center retrospective cohort study of acute care hospitals in Japan, we identified adult patients who were admitted to the ICU with independent activities of daily living before hospitalization and survived at least two days from April 2014 to October 2020. The primary outcome was functional impairment defined as Barthel Index ≤ 60 at hospital discharge. In the internal validation dataset (April 2014 to March 2019), using the routinely collected 94 candidate predictors within two days of ICU admission, we trained and tuned the six conventional and machine learning models with repeated random sub-sampling cross-validation. We computed the variable importance of each predictor to models. In the temporal validation dataset (April 2019 to October 2020), we measured the performance of these models.

Results: We identified 19,846 eligible patients. Functional impairment at discharge was developed in 33% of patients ($n=6,488/19,846$). In the temporal validation dataset, all six models showed good discrimination ability with areas under the curve above 0.86, and the differences among the six models were negligible. Variable importance showed newly detected early predictors, including worsened neurologic conditions and catabolism biomarkers such as decreased serum albumin and increased blood urea nitrogen.

Conclusions: We successfully developed early prediction models of new-onset functional impairment after ICU admission that achieved high performance using only data routinely collected within two days of ICU admission.

This study has already been published in “Intensive Care Med. 2022;48(6):679-689. doi:10.1007/s00134-022-06688-z” .

HL4-3 Postintensive Care Syndrome-Family Associated With COVID-19 Infection~Single Center Observational Studies~

Kasumi Shirasaki

Department of Emergency and Critical Care Medicine, St. Luke's International Hospital, Tokyo, Japan

【Background】 Post-intensive care syndrome in family (PICS-F) refers to psychological distress experienced by the family members of severely ill patients, with a prevalence of 20–40%. The purpose of this study was to examine the factors involved in the development of PICS-F and the long-term outcomes of PICS-F associated with severe COVID-19 infection.

【Method】 This was a retrospective observational studies of a single center. COVID-19 patients admitted to the ICU between March 23, 2020 and September 30, 2021 and their family members were eligible. The first survey was conducted using the Hospital Anxiety and Depression Scale (HADS), the Impact of Event Scale-Revised (IES-R), and the Family Satisfaction with the ICU Survey (FS-ICU) in November 2021. The second survey was conducted using HADS, IES-R, and the Connor-Davidson Resilience Scale-25 (CD-RISC-25) in November 2022.

【Result】 A total of 85 patients diagnosed with COVID-19 were admitted to the ICU, and 20 patients were excluded. Of the 65 eligible family members, 57 (88%) responded and were included in the first analysis. The percentages of anxiety, depression, and posttraumatic stress disorder (PTSD) were 25%, 28%, 4%, and 21 family members (37%) developed PICS-F. Multivariable analysis showed that FS-ICU scores were independently associated with PICS-F development (odds ratio, 0.019; 95% CI, 0.001–0.37; $p = 0.004$). Of the 57 family members in the first survey, 46 (81%) responded and were included in the second analysis. The percentages of anxiety, depression, and PTSD were 24%, 33%, 2%, and 18 family members (39%) developed PICS-F. On univariate analysis, the CD-RISC-25 score was significantly associated with PICS-F ($p = 0.024$). Furthermore, compared to one year earlier, four family members overcame PICS-F, whereas six family members developed PICS-F over the past year.

【Conclusion】 Approximately 40% of family members had symptoms of PICS-F. The FS-ICU score and the CD-RISC-25 score were significantly associated with PICS-F. Increasing the level of ICU care satisfaction and interventions to foster resilience in family members may help prevent PICS-F and contribute to its treatment.

November 28 (Tue.) 15 : 45~17 : 00 Room 2 (Tokyo Dome Hotel B1 Grand Ballroom TENKU (North))

HL4-4 Efforts to develop a COVID-19 pneumonia severity prediction score using lung ultrasound

Takuro Endo

Department of Emergency Medicine, International University of Health and Welfare, School of Medicine, Narita Hospital, Chiba

This presentation reports on a research project funded by the Marumo Emergency Medicine Foundation. The objective was to efficiently identify cases of silent pneumonia in COVID-19 patients undergoing hotel-based medical care. The goal was to develop a scoring system that extracts patients with an abnormality proportion exceeding a certain threshold on chest CT, by combining slight changes in vital signs and portable pulmonary echocardiography findings. Result 1: The National Early Warning Score (NEWS) accurately identifies COVID-19 lung disease. The study included 249 COVID-19 hospitalized patients during the Delta variant outbreak from June to December 2021. A retrospective validation was conducted. Upon arrival, the severity of lung lesions on chest CT was evaluated based on the area of consolidation, crazy paving, and ground-glass opacities, with judgments categorized as Severe (>50%), Moderate (10-50%), or Minimal (<10%). The NEWS calculated from vital signs upon arrival demonstrated an AUC of 0.90 and a cut-off score of 5 points for accurately identifying severe lung lesions. Although qSOFA was also compared, NEWS outperformed it. Result 2: Pulmonary echocardiography extracts COVID-19 lung disease with a certain level of accuracy. The study involved 10 COVID-19 hospitalized patients in December 2021. Lung ultrasound (LUS) scores were evaluated on a scale of 0-36 points, with 3 points assigned to each of the 12 lung regions, PMID: 32515793. The positive predictive value was 37.5%, and the negative predictive value was 100%. Discontinuation: Based on the aforementioned results, a verification of the pneumonia severity prediction score by adding echocardiography scores to NEWS was planned. However, the prevalence of silent pneumonia drastically decreased due to the emergence of the Omicron variant. The intended case accumulation within the planned period was not achieved. Result 3: Results of a derivative study were reported in *Acute Med Surg* (PMID: 37261374). The predictive performance of NEWS (AUC 0.88) for severe outcomes of COVID-19 did not significantly differ from the Kanagawa Prefecture score (AUC 0.86).

HL4-5 Study of Advance Care Planning by Acute Care Physician (ACP-2 study)

Natsuo Kamimura

Department of Emergency and Critical Care Medicine, Tokyo Medical University Hospital

Background

In emergency departments in Japan, we sometimes treat elderly patients who appear to be near the end of life, and we realize that they do not discuss their care adequately in advance. We focused on Advance Care Planning (ACP) in emergency medicine and planned the “ACP-2 study” based on the following previous study.

As the previous study, we included 468 patients aged 75 years or older who were urgently transported to six critical care centers in Niigata Prefecture. Only 32 patients (6.8%) had discussed their care prior to admission, and 93 (19.8%) had discussed their care after admission.

This study suggests that the acute care physicians should be responsible for ACP, as many elderly patients are transported to the critical care centers as emergency without the opportunity to discuss their own care plan in advance.

Based on these results, we planned the following study to clarify the current status of ACP performed by acute care physicians in Japan.

Summary of the ACP-2 study

This study is a multicenter, prospective, observational study of critical care centers in Japan.

Patients aged 65 years or older who were treated by acute care physicians will be included. Patient backgrounds and achievement of ACP performed by acute care physician will be recorded. Questionnaires will be sent to patients to determine their satisfaction with treatment and whether their goals were adequately shared with health care providers, etc. The correlation between achievement of ACP and questionnaire results and whether there is any variation among facilities will be evaluated.

Subsequently

The above study will be designated as Study 1 of the ACP-2 study. Based on the results of Study 1, issues related to the dissemination of ACP and improvement of patient satisfaction, etc. will be identified. And we plan to conduct an intervention study (Study 2) using the data from Study 1 as a control group.

HL5-1 A multicenter prospective study to validate prediction rules for CT among patients with minor head and neck trauma

Hiraku Funakoshi

Tokyobay Urayasu Ichikawa Medical Center

BACKGROUND

For minor head and neck trauma (MHNT), several clinical prediction rules have developed for the need of imaging. However, they are problematic because they 1) require CT in all patients over 65 or 70 and 2) exclude patients taking antithrombotic medications.

In Japan, where the number of elderly patients and patients on oral anticoagulants is increasing, simply applying the existing rules will not be a solution to avoid excessive imaging. Therefore, validating and improving the current prediction rules is crucial.

Therefore, this study aims to validate the existing prediction rules for MHNT. We also aimed to establish the new criteria for head and neck CT for patients with MHNT by setting new age threshold and validating whether the rule can be safely applied to patients taking oral antithrombotic drugs. This abstract describes a result of the interim analysis.

METHODS

This multicenter prospective observational study included patients with MHNT aged 18 years or older presenting between July 2022 and July 2023. Patients with AIS > 2 trauma other than to the head, history of intracranial surgery, penetrating trauma, and pregnant women were excluded. The primary outcome was defined as death or hospitalization for more than two days requiring surgery and ventilatory management within 24 hours for head trauma. For cervical spine injuries, the primary outcome was defined as all cervical spine fractures expanding vertebral arches.

RESULTS

During study period, 2,290 patients were included. Median age was 71 (IQR, 51–82), and 45% were women. The leading cause was falling (22%), and alcohol consumption was observed in 10%. Anticoagulants and antiplatelet medications were taken by 11% and 8% of patients, respectively, and CT was deemed unnecessary by the on-site physician in 12% of cases. Abnormal findings on imaging studies included head CT in 11%, neck CT in 2%, and MRI in 1%. Of all patients, 12% were hospitalized.

CONCLUSION

Existing rules determined that about 60% of MHNT required CT based on age alone. Further data accumulation and revision of age thresholds and risk factors will help establish criteria for CT of the head and cervical spine.

HL5-2 Association of trauma severity with antibody seroconversion in heparin-induced thrombocytopenia

Motoo Fujita

Department of Emergency and Critical Care Medicine, Tohoku University Hospital

BACKGROUND

Heparin administration can induce the production of anti-platelet factor 4 (PF4)/heparin antibodies with platelet-activating properties, causing heparin-induced thrombocytopenia (HIT). Previous studies have suggested that trauma severity influences HIT immune responses, but their relationship has not been fully explained. This study aimed to clarify this association by multicenter prospective observational study.

METHODS

Trauma patients who met the criteria of age 18 years or older and Injury Severity Scores (ISSs) of ≥ 9 from March 2018 to February 2019 were included. Patients who did not receive any heparin and those who received it as flushes or for treatment were also included. Patients were divided into three groups based on trauma severity (to mild [ISS 9–15], moderate [ISS 16–24], and severe injury groups [ISS ≥ 25]) and were compared by the seroconversion time and rate, as well as the disappearance rate of antibodies on day 30.

RESULTS

A total of 184 patients were included: 55, 62, and 67 patients were classified into the mild, moderate, and severe injury groups, respectively. Overall, the seroconversion rates of anti-PF4/heparin immunoglobulin G (IgG) and HIT antibodies by washed platelet activation assay were 26.6% and 16.3%, respectively. There was a significant difference in the seroconversion rates of anti-PF4/heparin IgG ($p = 0.016$) and HIT antibodies ($p = 0.046$) among the groups. Seroconversion rates in both assays increased with increasing trauma severity. The time required to achieve seroconversion was similar (between 5 and 10 days of trauma onset) regardless of heparin administration. Anti-PF4/heparin IgG and HIT antibodies were no longer detected on day 30 in 28.6% and 60.9% of seroconverted patients, respectively.

CONCLUSION

Development of HIT antibodies was observed commonly in severely injured trauma patients. Heparin-induced thrombocytopenia antibody development may be related to trauma severity, with a high disappearance frequency on day 30.

November 29 (Wed.) 9 : 00~10 : 00 Room 2 (Tokyo Dome Hotel B1 Grand Ballroom TENKU (North))

HL5-3 Comparison of torso trauma and traumatic brain injury via plasma proteomic profiles; A prospective cohort study

Jotaro Tachino

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Background

The molecular pathogenesis of the acute phase of trauma is complex and remains largely unknown. The purpose of this study was to elucidate the molecular pathogenesis of each injury subgroup by screening a wide range of relevant proteins in the acute phase of trauma and comparing torso trauma and traumatic brain injury.

Methods

This prospective cohort study used Olink Explore 3072® to collect plasma from blunt trauma patients for proteomic analysis. Unsupervised hierarchical clustering using proteins significantly altered by torso trauma or TBI compared to patients with minor trauma was used to determine clinical phenotypes.

Results

Fifty-nine patients were finally included in the study. Of these, 15 had minor trauma, 15 had torso trauma, and 29 had TBI. Overall, the median age was 51 years, the median injury severity score (ISS) was 22, and in-hospital mortality was 8.5%. Using the minor trauma cases as controls, 26 proteins (22 up-regulated and 4 down-regulated) in torso trauma and 68 proteins (38 up-regulated and 30 down-regulated) in TBI were observed to be significantly altered proteins when the false discovery rate was set to a p-value of <0.1 and corrected by the Benjamini-Hochberg method. Unsupervised hierarchical cluster analysis of altered proteins revealed five clinical phenotypes, $\alpha - \varepsilon$, as follows: phenotype α had torso trauma (abbreviated injury scale (AIS) ≥ 3 , n=8), phenotype β had young cases with TBI (AIS ≥ 3 , n=5), phenotype γ had severe TBI (Glasgow coma scale ≤ 8 , n=8), phenotype δ had TBI or torso trauma with mild hyperfibrinolysis (n=18), and phenotype ε had minor trauma (median ISS=7, n=20). Torso trauma patients showed changes associated with smooth muscle adaptation, blood pressure regulation, hypermetabolism, and hypoxemia. TBI patients showed blood coagulation abnormalities and altered nerve regeneration and differentiation.

Conclusions

We performed proteomic analysis of patient plasma in torso trauma and TBI to assess molecular pathogenesis, suggesting that torso trauma involves pathways related to tissue hypoperfusion and TBI involves pathways related to coagulation disorders and nerve regeneration.

HL5-4 FOLLOW-UP Trauma study -Preliminary Report-

Asuka Tsuchiya

Department of Emergency and Critical Care Medicine, Tokai University School of Medicine

[Background] The in-hospital mortality of trauma patients is decreasing due to medical and trauma care system advances. Although the long-term sequelae may prevent patients from reintegrating into society, we do not know trauma patients' long-term prognosis (quality of life), their trajectories, and the rate of return to society. This study is a multicentre prospective cohort study to answer this question. We collected comprehensive post-discharge long-term outcome data [patient location, QOL(EQ5D-5L/SF-12v2), etc.] by post for patients whose consent was obtained (time points; at discharge and 2/4/6/12/24 months after injury). Inclusion criteria were as follows; ISS \geq 12 aged 16 years or older who were transferred from the scene.

[Methods] Study design; descriptive and exploratory study. Period; September 2020 to September 2023. We described the number of facilities and patients, the proportion of long-term outcome questionnaires obtained, the patient's location, EQ5D5L, SF-12v2, and trauma severity. Also, we analyzed the association between patients' social backgrounds and outcomes.

[Results] Sixteen facilities participated in this study, and we gathered 977 patients. The questionnaire response rates were 72.5, 73.3, 77.1, 77.5, and 66.1% for months 2, 4, 6, 12, and 24, respectively. Approximately 50% of patients were home six months after the injury. After one year, the SF-12v2 physical and mental domain deviation was approximately 40 and 55. Both SF-12v2 and EQ5D5L had better mental than physical scores. Comprehensive QOL was lower than in Japanese men in their 80s, similar to chronic maintenance hemodialysis patients. We will report the results of the exploratory study on congress day.

[Discussion] The patient follow-up rate was good. The good SF-12v2/EQ5D5L (after one year) mental score of Japanese trauma patients may be due to the universal health insurance system. However, the comprehensive QOL suggests that patients are still disabled after one year, and we need different approaches to improve the reintegration rate.

HL6-1 Optimal Target Blood Pressure in Elderly with Septic Shock: OPTPRESS trial

Akira Endo

Tsuchiura Kyodo General Hospital, Department of Acute Critical Care Medicine

While several statements in the Surviving Sepsis Campaign Guidelines have been revised significantly to date, the target blood pressure "mean arterial pressure (MAP) ≥ 65 mmHg," which is one of the core components for initial resuscitation in septic shock, has remained unchanged since the first edition, although the initial rationale for this goal was weak.

In 2014, SEPSISPAM trial, the first large randomized trial examining target MAP for resuscitation in septic shock, reported that the higher target of MAP (80-85 mmHg) did not increase patient survival compared to the MAP of 65-70 mmHg but increased atrial fibrillation. The 65 trial published in 2020 suggested that a lower target MAP of 60-65 mmHg may be beneficial in patients with vasodilatory shock aged >65 years. However, in the SEPSISPAM trial, about half of the patients were younger than 65 years, and only 44% had chronic hypertension. In the 65 trial, septic shock accounted for less than half of the patients. In general, systemic tissue perfusion depends not only on MAP but also on vascular resistance controlled by autoregulation. Furthermore, autoregulation varies greatly depending on patient background, disease type and severity, and organ. Thus, considering the difference of patient background and disease type, results of previous studies cannot be applied directly in clinical practice in Japan, the world's most aged society.

The Optimal Target Blood Pressure in Elderly with Septic Shock (OPTPRESS) trial is a large randomized trial, which investigates the target MAP for initial resuscitation in septic shock and is now progress in Japan. Similar to the SEPSISPAM trial, OPTPRESS trial compares MAP targets of 80-85 mmHg vs. 65-70 mmHg; however, it includes only septic shock patients aged ≥ 65 years, who have a higher proportion of chronic hypertension in the base population. Based on the findings of previous studies, patients are randomized within 3 hours after the initiation of norepinephrine, and vasopressin is added from the early phase of resuscitation to minimize the adverse events due to catecholamines. Details of the OPTPRESS trial and its current progress status will be reported.

HL6-2 Levetiracetam versus fosphenytoin as a second-line treatment after diazepam for adult convulsive status epilepticus

Kensuke Nakamura

Department of Critical Care Medicine, Yokohama City University Hospital

Background: Status epilepticus (SE) is an emergency condition in which prompt and reliable seizure cessation is important. Although fosphenytoin (FPHT) is recommended as a second-line drug, levetiracetam (LEV) has been reported to have comparable efficacy and high safety profile. Therefore, we compared LEV and FPHT in adult SE. This study was conducted as a Japanese Association for Acute Medicine initiative study.

Methods: We conducted a multicenter randomized controlled trial with a non-inferiority design. Adult patients with convulsive SE were pre-treated with diazepam and then randomized to receive FPHT 22.5 mg/kg or LEV 1000-3000 mg. The primary endpoint was the rate of seizure cessation within 30 minutes after study drug administration.

Results: A total of 176 adult SE patients (82 FPHT and 94 LEV) were enrolled, and 3 were excluded from the full analysis set. The rate of seizure cessation was 83.8% (67/80) in the FPHT group and 89.2% (83/93) in the LEV group, the difference of 5.5% (95% CI -4.7 to 15.7, $p=0.29$), confirming non-inferiority of LEV by the Farrington-Manning test ($p<0.001$). In the FPHT and LEV groups, in that order, the seizure recurrence rate within 24 hours was 15% (12/80), 17.2% (16/93), $p=0.70$, and the intubation rate within 24 hours was 15% (12/80), 16.1% (15/93), $p=0.84$. There was no significant difference in the Modified Rankin Scale at day 7. 3 patients in the FPHT group had serious adverse events compared to none in the LEV group ($p=0.061$).

Conclusion: The efficacy of LEV in adult SE is comparable to that of FPHT, and LEV can be considered as a second-line drug for SE. With the results of this study, the Japanese Association for Acute Medicine submitted a public knowledge application to the Ministry of Health, Labour and Welfare, and LEV became covered by insurance for SE in September 2022.

J Neurol Neurosurg Psychiatry. 2023;94(1):42-48

November 29 (Wed.) 10 : 10~11 : 10 Room 2 (Tokyo Dome Hotel B1 Grand Ballroom TENKU (North))

HL6-3 RCT Assessing Temperature Management after OHCA with Moderate Initial Illness Severity (R-CAST OHCA): Study Plan 2023

Hiromichi Naito

Okayama University Faculty of Medicine, Dentistry, and Pharmaceutical Sciences, Department of Emergency, Critical Care, and Disaster Medicine

Background

Preventing fever or temperature management is a major component in treating post-cardiac arrest syndrome (PCAS). However, debate regarding the effectiveness of therapeutic hypothermia is ongoing. A stratified analysis of patients with moderately severe PCAS might be the key to determining the effectiveness of therapeutic hypothermia for PCAS. We started a multicenter, randomized controlled trial (RCT) to examine differences in 30-day neurological outcomes between induced hypothermia and normothermia in patients who remained in coma with return of spontaneous circulation (ROSC) after out-of-hospital cardiac arrest (OHCA). This presentation discusses the challenges and future direction of the ongoing RCT.

Methods

This is a multicenter RCT in Japan that includes adult patients with OHCA of medical cause who remain in coma after ROSC. Patients with moderately severe PCAS who might benefit from hypothermia are selected based on their illness severity, which is determined using the revised post-Cardiac Arrest Syndrome for Therapeutic hypothermia (rCAST) score, targeting patients with moderate severity (rCAST scores ranging from 5.5 to 15.5 points). In the hypothermia group, patient temperature is maintained at 34°C for 28 hours, followed by rewarming at the speed of 0.25°C per hour (until 40 hours: 37°C). In the normothermia group, a temperature of 37°C (within the range of 36.5-37.7°C) is maintained for 40 hours. Fever is prevented in both groups until 72 hours. The primary outcome measure is Cerebral Performance Category score at 30 days after cardiac arrest, assessed by blinded evaluators.

Results

Patient enrollment started in July 2022. Thirty-four facilities are participating, and approximately half of the facilities have enrolled at least one case. There has been a delay in enrolling participating patients, with approximately half of the planned enrollment completed at June 2023 (380 cases planned overall). The study is enrolling patients without significant concerns.

Conclusion

The JAAM R-CAST OHCA study aims to examine the effectiveness of hypothermia vs. normothermia in patients with moderately severe PCAS.

HL6-4 Hydrogen Inhalation Improves 90-Day Neurological Outcome in Post-Cardiac Arrest Syndrome: HYBRID II Trial

Masaru Suzuki

Department of Emergency Medicine, Tokyo Dental College Ichikawa General Hospital

Background: The neurological intact survival of OHCA is generally low, and there are limited treatment options for post-cardiac arrest syndrome (PCAS). Molecular hydrogen (H₂) has been shown to effectively mitigate ischemia-reperfusion injury in various animal models.

Objective: To investigate the potential of H₂ inhalation to improve neurological outcomes in patients with PCAS.

Methods: This multicenter, double-blind, randomized controlled trial (jRCTs031180352, UMIN000019820) enrolled adults who experienced cardiac OHCA and had GCS < 8 at 20 minutes after the restoration of spontaneous circulation. Within 6 hours, patients were randomly assigned to receive either H₂ gas inhalation (2% H₂+oxygen+nitrogen) or control gas inhalation (oxygen+nitrogen) for 18 hours. Targeted temperature management at 32-36 Celcius degrees was implemented. The primary endpoint was the rate of favorable neurological outcomes at 90 days, defined as CPC score of 1 or 2. Secondary endpoints included the modified Rankin Scale (mRS) score at 90 days and the survival rate. The CPC and mRS scores were independently determined by two neurologists.

Results: The trial was prematurely terminated due to the COVID-19 pandemic after enrolling a total of 73 participants. The per-protocol set included 72 participants (H₂ group: 39, control group: 33). At 90 days, the rate of favorable outcomes was 56% in the H₂ group and 39% in the control group (odds ratio=1.99, 95% confidence interval: 0.78-5.11, P=0.15). The proportion of patients with mRS score of 0 was 46% in the H₂ group and 21% in the control group (3.18, 1.12-9.06, P=0.03). The survival rate at 90 days was 85% in the H₂ group and 61% in the control group (3.58, 1.17-10.9, P=0.02). No specific adverse events related to H₂ inhalation were observed.

Conclusion: Despite the premature termination of the trial and the failure to demonstrate efficacy, inhalation of H₂ gas was associated with improved survival rates and neurological outcomes at 90 days in patients with PCAS. No specific adverse events were observed.

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November 29 (Wed.) 14 : 50~15 : 50 Room 2 (Tokyo Dome Hotel B1 Grand Ballroom TENKU (North))

HL7-1 Post Intensive Care Syndrome in Sepsis and Septic Shock: a multicenter prospective observational study - ILOSS Study

Takayuki Ogura

Tochigi Prefectural Emergency and Critical Care Center, Imperial Gift Foundation SAISEIKAI Utsunomiya Hospital

[Background]

Sepsis is a risk factor for Post Intensive Care Syndrome (PICS), but there is a lack of evidence from Japan. We hypothesized that the incidence rate of PICS in patients admitted to ICUs in Japan with sepsis and septic shock is high, and many patients are diagnosed with PICS even after discharge".

[Methods]

This was a prospective observational study conducted in 21 ICUs across Japan. Patients aged 18 and over who had been admitted to the ICU for more than 48 hours due to sepsis (Sepsis-3) from November 2020 to April 2022 were included. We conducted a questionnaire survey on PICS at the time of hospital discharge and 3, 6, and 12 months after the discharge, through face-to-face meetings, phone calls, and/or mailings. The primary outcome was the incidence of PICS, defined as meeting at least one of the following three criteria: physical dysfunction (Barthel Index score 90 or less), cognitive dysfunction (SMQ score below 40), and psychological dysfunction (either HADS anxiety score of 8 or higher, HADS depression score of 8 or higher, or IES-R score of 25 or higher).

[Results]

A total of 324 patients were enrolled, with a median age of 74, 194 males (60%), 248 (77%) with septic shock, and 195 (60%) underwent mechanical ventilation. As of June 18, 2023, all 324 patients had been discharged, one patient was before the 6-month follow-up, and two patients were before the 12-month follow-up.

The mortality rates at discharge, and at 3-, 6-, and 12-month follow-ups were 23%, 29%, 33%, and 39%, respectively. The successful follow-up rates at discharge, and at 3-, 6-, and 12-month follow-ups, excluding deceased cases, were 99% (247/249), 94% (216/231), 84% (182/216), and 89% (177/199), respectively.

The number of patients diagnosed with PICS at each point was 87% (216/249), 82% (189/231), 50% (108/216), and 44% (88/199), respectively.

[Conclusion]

The incidence rate of PICS in patients with sepsis is extremely high, with more than 80% of patients diagnosed with PICS until 6 months after discharge. Although there was a gradual decrease over time, PICS was observed in nearly half of the patients at the 12-month follow-up after the hospital discharge.

HL7-2 Development of antimicrobial strategy using Gram staining in the era of drug-resistant bacteria

Jumpei Yoshimura

Department of Traumatology and Acute Critical Medicine, Osaka University Graduate School of Medicine

Ventilator-associated pneumonia (VAP), a prevalent nosocomial infection afflicting critically ill patients, the prevailing practice often entails the initial selection of broad-spectrum antimicrobial agents due to concerns regarding inadequate coverage during the nascent stages of therapy. Lamentably, there exists no established safe methodology to curtail the utilization of these broad-spectrum agents.

Consequently, we embarked on a series of meticulous inquiries to elucidate the clinical significance of Gram staining in guiding antimicrobial selection. Initially, we conducted a single-center retrospective observational study, where we demonstrated that basing antimicrobial selection on Gram staining of aspirated sputum reduced excessive broad-spectrum antimicrobials in comparison to the guidelines recommended by the IDSA/ATS for VAP (Yoshimura et al. *Crit Care* (2017) 21:156). Subsequently, a single-center prospective intervention study was undertaken to validate that treatment with narrow-range antimicrobials, guided by Gram staining, yielded comparable pneumonia cure rates to those observed in a previous extensive clinical study employing broad-spectrum antimicrobials for VAP treatment (Yoshimura et al. *Crit Care* (2018) 22:338).

Drawing upon the outcomes of these preceding investigations, we proceeded to calculate the requisite number of cases to substantiate the efficacy of Gram staining (Yoshimura et al. *Trials* (2018) 19:614) and commenced a multicenter randomized clinical trial spanning 12 centers nationwide in April 2018. The findings evinced that antimicrobial therapy tailored to Gram staining yielded a substantial reduction of 38.8% ($p < 0.01$) in the utilization of anti-MRSA agents and 30.1% in the usage of anti-*Pseudomonas aeruginosa* agents without compromising patient outcomes, when compared to the antimicrobial therapy adhering to the IDSA/ATS guidelines (Yoshimura et al. *JAMA Netw Open* (2022) 5(10): e2240335).

In this presentation, we shall expound upon the judicious application of antimicrobial agents, underpinned by the culmination of our comprehensive research endeavors, while concurrently exploring avenues to optimize antimicrobial selection.

November 29 (Wed.) 14 : 50~15 : 50 Room 2 (Tokyo Dome Hotel B1 Grand Ballroom TENKU (North))

HL7-3 Occurrence and incidence rate of PIVC-related phlebitis and complications in critically ill patients

Hideto Yasuda

Infection Prevention and Vascular Access Group, The University of Queensland and Herston Infectious Diseases Institute

Background: The lack of precise information on the epidemiology of peripheral intravascular catheter (PIVC)-related phlebitis and complications in critically ill patients results in the absence of appropriate preventive measures.

Therefore, we aimed to describe the epidemiology of the use of PIVCs and the incidence/occurrence of phlebitis and complications in the intensive care unit (ICU).

Methods: This prospective multicenter cohort study was conducted in 23 ICUs in Japan. All consecutive patients aged ≥ 18 years admitted to the ICU were enrolled. PIVCs inserted prior to ICU admission and those newly inserted after ICU admission were included in the analysis. Characteristics of the ICU, patients, and PIVCs were recorded. The primary and secondary outcomes were the occurrence and incidence rate of PIVC-related phlebitis and complications (catheter-related blood stream infection [CRBSI] and catheter failure) during the ICU stay.

Results: We included 2741 patients and 7118 PIVCs, of which 48.2% were inserted in the ICU. PIVC-related phlebitis occurred in 7.5% (95% confidence interval [CI] 6.9–8.2%) of catheters (3.3 cases / 100 catheter-days) and 12.9% (95% CI 11.7–14.2%) of patients (6.3 cases / 100 catheter-days). Most PIVCs were removed immediately after diagnosis of phlebitis (71.9%). Grade 1 was the most common phlebitis (72.6%), while grade 4 was the least common (1.5%). The incidence rate of CRBSI was 0.8% (95% CI 0.4–1.2%). In cases of catheter failure, the proportion and incidence rate per 100 intravenous catheter-days of catheter failure were 21% (95% CI 20.0-21.9%) and 9.1 (95% CI 8.7–10.0), respectively.

Conclusion: PIVC-related phlebitis and complications were common in critically ill patients. The results suggest the importance of preventing PIVC-related complications, even in critically ill patients.

HL7-4 Identifying Sepsis Populations Benefitting from Anticoagulant Therapy: A Prospective Cohort Study.

Kazuma Yamakawa

Osaka Medical and Pharmaceutical University

Background: Anticoagulant therapy has seldom been achieved in randomized trials targeting nonspecific overall sepsis patients. Although the key components to identify the appropriate target in sepsis may be disseminated intravascular coagulation (DIC) and high disease severity, the interaction and relation of these two components for the effectiveness of therapy remain unknown.

Objective: This article identifies the optimal target of anticoagulant therapy in sepsis.

Methods: We used a prospective nationwide cohort targeting consecutive adult severe sepsis patients in 59 intensive care units in Japan to assess associations between anticoagulant therapy and in-hospital mortality according to DIC (International Society on Thrombosis and Haemostasis [ISTH] overt and Japanese Association for Acute Medicine DIC scores) and disease severity (Acute Physiology and Chronic Health Evaluation II [APACHE II] and Sequential Organ Failure Assessment scores). Multivariable Cox proportional hazard regression analysis with nonlinear restricted cubic spline including a two-way interaction term (treatment × each score) and three-way interaction term (treatment × ISTH overt DIC score × APACHE II score) was performed.

Results: The final study cohort comprised 1,178 sepsis patients (371 received anticoagulants and 768 did not). The regression model including the two-way interaction term showed significant interaction between intervention and disease severity as indicated by the ISTH overt DIC score and APACHE II score ($p = 0.046$ and $p = 0.101$, respectively). Three-way interaction analysis revealed that risk hazard was suppressed in the anticoagulant group compared with the control group in the most severe subset of both scores.

Conclusion: Anticoagulant therapy was associated with better outcome according to the deterioration of both DIC and disease severity, suggesting that anticoagulant therapy should be restricted to patients having DIC and high disease severity simultaneously.

HL8-1 Early Restricted Oxygen Therapy after Resuscitation from Cardiac Arrest (ER-OXYTRAC) trial

Ryo Yamamoto

Keio University School of Medicine, Department of Emergency and Critical Care Medicine

Cardiac arrest, an emergency and critical condition, should be appropriately managed to prevent unfavorable clinical outcomes. Strenuous resuscitative efforts from the scene to a hospital would lead to the return of spontaneous circulation (ROSC) from cardiac arrest, whereas hemodynamic instability and neurological dysfunction are known to emerge even after the ROSC, which is known as post-cardiac arrest syndrome (PCAS). While targeted temperature management (TTM) after ROSC improves the neurological outcomes of patients with PCAS [4, 5], various studies have failed to elucidate an effective treatment that would help PCAS patients to regain optimal neurological functions.

Avoiding supraphysiologic oxygen in patients who obtained ROSC following cardiac arrest has been suggested by several observational studies as a potential therapy for PCAS. Meta-analyses and prospective observational studies indicated that lower partial pressure of arterial oxygen (PaO₂) within 6–24 h after ROSC, particularly <300 mmHg, was associated with favorable neurological outcomes and decreased mortality among patients with PCAS [10]. Accordingly, the American Heart Association guidelines for cardiopulmonary resuscitation (CPR) recommend 92%–94% of peripheral oxygen saturation (SpO₂) as a lower threshold of target oxygenation in patients achieving ROSC. However, studies validating the safety and effectiveness of restricted-oxygen administration with a lower SpO₂ target in patients with PCAS are sparse.

Thus, we aimed to elucidate the effectiveness of early restricted-oxygen therapy within 12 h after ROSC, using 94% of target SpO₂, in patients with cardiac arrest. We hypothesized that early restricted oxygen therapy with 94%–95% of target SpO₂ is associated with a higher rate of favorable neurological functions, as compared with liberal oxygen therapy with 98%–100% of target SpO₂. As of June 2023, a year passed since the study initiation. In this presentation, development of research idea, preparation of trial, and conduction of ER-OXYTRAC were explained.

HL8-2 Incidence and Characteristics of Biphasic Anaphylaxis in the Covid-19 Era: A Multi-center Prospective Study

Seiro Oya

Yamamoto Memorial Hospital

Background:

Anaphylaxis is a systemic allergic reaction that is sometimes fatal. Although the clinical manifestations of this disease have been studied mainly in Europe and the United States, the symptoms and course of the disease may vary among different populations and depending on the allergic trigger. Furthermore, the frequency and characteristics of so-called biphasic anaphylaxis, in which symptoms subside and then flare up, have not yet been adequately studied. The purpose of this study was to clarify the incidence and clinical characteristics of patients with biphasic anaphylaxis in Japan and to provide more appropriate medical care.

Methods:

The study was conducted as a multi-center, prospective, observational study over two years from April 2020 to March 2022 at eight emergency medical institutions in Japan, known as the Japan Anaphylaxis Research Group (JARG). All patients diagnosed with anaphylaxis in the emergency department (excluding those with cardiopulmonary arrest) were included in the study, which included patient demographics, history of allergy, organ symptoms, medications used, and clinical course. The outcome was the development of biphasic anaphylaxis, and the statistical method was multivariate analysis (logistic regression analysis) using EZR. This study was approved and conducted by the clinical research review of the National Hospital Organization Shizuoka Medical Center, the primary institution.

We report the results of this study with additional discussion.

November 29 (Wed.) 15 : 50~16 : 50 Room 2 (Tokyo Dome Hotel B1 Grand Ballroom TENKU (North))

HL8-3 Phase 2 study of intravenous perampanel in Japanese epilepsy patients -safety evaluation of alternative to oral dosing-

Koji Iida

Hiroshima University Hospital

RATIONALE: Perampanel (PER) is an oral anti-seizure medication (ASM) which inhibits the post-synaptic AMPA receptor. Intravenous infusion formulation of PER has been developed as alternative treatment option for patients when oral administration of PER is not feasible. Study 240 (NCT 03754582), a multicenter, uncontrolled, open-label Phase II study was conducted to evaluate the safety and tolerability of 30-minute intravenous infusions of PER as a substitute for oral tablet in patients with epilepsy in Japan.

METHODS: Study 240 involved patients aged 12 years and older with focal-onset seizures or primary generalized tonic-clonic seizures who received a stable dose of 8 to 12 mg/day of oral PER. This study consisted of 3 phases: the Pretreatment Phase (up to 29 days; oral PER), Treatment Phase (4 days; intravenous PER), and Follow-up Phase (up to 14 days; oral PER). The patients switched from oral tablet to 30-minute intravenous infusion of PER at equivalent daily doses during Treatment Phase. The patients were discharged the day after the last intravenous infusion of PER, and treatment was switched back to their original doses of oral PER.

RESULTS: Twenty-one patients aged 18 to 62 (mean 40.7) enrolled and received intravenous infusions of PER. Fifteen (71.4%) patients reported treatment-emergent adverse events (TEAEs) during the Treatment Phase. The most frequently reported TEAEs during the Treatment Phase were dizziness in 6 (28.6%) patients and somnolence in 3 (14.3%) patients, which were all mild in severity and resolved during the Treatment Phase. The mean changes in the maximum plasma concentrations of PER were not higher than 1.4-fold for each dosage by switching from oral tablet to 30-minute intravenous infusion under steady state conditions. In seizure frequency per day, there was no considerable change by switching from oral PER to intravenous PER and back to oral.

CONCLUSION: Results from Study 240 showed that 30-minute intravenous infusions of PER is an interchangeable to oral PER and intravenous treatment was well-tolerated and efficacious in patients with epilepsy.

*Presented at AES 2020 and JES 2023

HL8-4 Effects of mamushi antivenom serum: a multicenter prospective observational study (OROCHI study) analysis

Kotaro Kaneda

Advanced Medical Emergency and Critical Care Center, Yamaguchi University Hospital

Background: Although mamushi bites are the most common snakebite in Japan, the efficacy of mamushi antivenom serum has not been established.

Objective: To determine the effects of mamushi antivenom serum.

Method: A multicenter prospective Observational Research of Clinical course after Mamushi bite (OROCHI) study was conducted with the participation of 23 hospitals in Japan. Subjects were mamushi bite patients who were hospitalized. The primary endpoint was the length of hospital stay, and secondary endpoints were adverse effects, pain severity (NRS) and grade classification. A cohort analysis was conducted with and without the use of mamushi antivenom serum.

Results: 106 cases were enrolled from 18 hospitals between 22 April 2020 and 31 October 2022. 92 cases were included in the analysis, 53 in the antivenom group and 39 in the no-antivenom group. The median age of patients was 72 years, time from injury to presentation was 65 minutes, 52% were male. The antivenom group had a higher NRS and Grade at presentation compared to the no-antivenom group. Bite site incision was performed in 10%, antimicrobials in 80% and cepharanthine in 80% of cases, with no difference between the two groups, but steroids were administered significantly more often in the antivenom group (49% vs. 15%). There was no significant difference in the length of hospital stay between the antivenom and no-antivenom groups, with a median of 5 days (interquartile range 3-6 days) and 3 days (interquartile range 1-8 days), respectively. The adjusted hazard ratio of antivenom serum to hospital discharge after adjustment for pain at presentation, Grade classification at presentation and age was 1.105 (95% confidence interval 0.687-1.779, $p=0.680$). Pain and Grade classification at presentation were significantly worse in the antivenom group, but no difference was observed after 48 hours in either pain or Grade classification. Adverse effects to the mamushi antivenom serum occurred as anaphylaxis in one patient and serum sickness in two patients.

Conclusion: Mamushi antivenom serum did not reduce the length of hospital stay, but its effect on pain and Grade classification was indicated.

HL9-1 Feasibility study of cerebral protection by transpulmonary cooling during cardiac arrest

Atsushi Sakurai

Division of Emergency and Critical Care Medicine, Department of Acute Medicine, Nihon University School of Medicine

Post-cardiac brain injury is the considerable cause of mortality and long-term disability. Post-cardiac arrest brain injury consists primary and secondary brain injury; the former caused mainly by increase of glutamate in the brain after cardiac arrest, latter caused by inflammation and apoptosis after resuscitation. For secondary brain injuries caused by cardiac arrest, the efficacy of targeted temperature management (TTM) improving outcome has been established. Nonetheless methods which further reduce brain damage and benefit neurological outcome need to be studied, and we considered that earlier intervention which attenuates primary brain injury to be most effective. From our past study, shortening time interval from cardiac arrest to resuscitation was the important factor to achieve good neurological outcome. For out-of-hospital cardiac arrest patients, most of the patients which took more than 30 minutes to resuscitate resulted poor neurological outcome even if TTM was conducted after resuscitation. In the current Emergency Medical Services in Japan, more than 30 minutes on average are necessary from the occurrence until the patient is transported to the hospital. Therefore, therapeutic method which could be conducted out of hospital is considered necessary to attenuate primary brain injury.

In early animal studies, intra-arrest cooling improves primary brain injury benefiting neurological outcome. In clinical practice, methods such as cold saline infusion and transnasal evaporative cooling had been approached, but none of them were able to improve the neurological outcome of patients after cardiac arrest. To implement out-of-hospital brain protection, we focused on the transpulmonary brain cooling by ventilating cooled oxygen. As blood flow in the lungs must be very slow during cardiopulmonary resuscitation, we expected that the blood could be cooled by ventilation with cooled oxygen. In our past study, we have confirmed safety in our study with healthy volunteers inhaling ice-cold oxygen. In this presentation, we will report our latest findings about transpulmonary brain cooling in a porcine model of cardiac arrest using improved cooling system.

HL9-2 Feasibility study of transpulmonary brain cooling using porcine cardiac arrest model

Haruka Uki

Medical Technology and Material Laboratory, Research and Business Development Division, Asahi Kasei Medical Co., Ltd.

[Background] In early animal studies intra-arrest cooling improve neurological outcome, nonetheless no clinical method which enables cerebral protection during cardiac arrest is established. In the past presentation, we reported that cold gas inhalation during cardiac arrest decreases the blood flow temperature, subsequently brain temperature. To further investigate the feasibility of transpulmonary cooling, we conducted a porcine study to optimize the transpulmonary cooling system and evaluate the glutamate level in the brain.

[Method] Cooled or room temperature oxygen was delivered to lungs during cardiopulmonary resuscitation (CPR) after ventricular fibrillation induction. CPR was conducted for an hour, and temperature and extracellular glutamate concentration were monitored in brain while ventilation. Helium was mixed with the oxygen to promote heat exchange in the lungs, and cold saline infusion was also combined with the cooled gases inhalation to promote intravenous cooling.

[Result] Brain temperature declined with cooled oxygen, and cooling rates were greater when helium was mixed with oxygen. Furthermore, combining transpulmonary cooling with cold saline infusion accelerated the decline in brain temperature, and suppressed the elevation of glutamate level in brain.

[Conclusion] Transpulmonary cooling during cardiac arrest decreased the blood temperature, subsequently brain, suppressing the elevation of glutamate level during ischemia. Transpulmonary brain cooling technology may contribute to establish a clinical method for cerebral protection.

HL9-3 Soluble thrombomodulin ameliorates aberrant hemostasis after rewarming in a rat accidental hypothermia model

Shuhei Takauji

Hokkaido University Hospital Emergency and Critical Care Center

Background: Physiological changes induced by accidental hypothermia(AH) include impaired consciousness, bradycardia, hypotension, arrhythmia, and electrolyte abnormalities, especially hypothermia-associated coagulopathy. We previously demonstrated that intrasplenic platelet activation caused aberrant hemostasis and thrombus formation after rewarming in a murine AH model (Horioka. *J Thromb Haemost.* 2019).

Clinically, when extracorporeal membrane oxygenation (ECMO) is indicated, anticoagulation with heparin is administered. However, ECMO for AH is difficult to control with heparin because the coagulation state is altered by changes in body temperature, increasing the risk of bleeding and thrombotic complications.

Thrombomodulin(TM) regulates coagulation of the blood by assisting in the production of activated protein C, resulting in an anticoagulant effect. The present study examined whether or not recombinant soluble thrombomodulin (rTM) can prevent thrombosis formation after rewarming using a rat experimental model of AH (Takauji, *Biochem Biophys Res Commun*, 2022).

Methods: Wistar rats were exposed to an ambient temperature of 20 °C under general anesthesia until their rectal temperature decreased to 26 °C. The Hypo group rats (n=5) were immediately euthanized, while the Hypo/Re group (n=5) and rTM group rats (n=5), which were administered rTM (1 mg/kg) via the tail vein, were rewarmed until the rectal temperature returned to 34 °C and then euthanized 6 h later. Tissue and blood samples were collected from all rats for histopathological and coagulation analyses at euthanasia.

Results: There was no significant change in the D-dimer level in the Hypo group rats, while the D-dimer level was significantly elevated at 6 h after rewarming in the Hypo/Re group rats, and histopathology detected both fibrin and platelets in the renal glomerulus. However, the rTM group rats did not show any elevation of the D-dimer levels at 6 h after rewarming, and no fibrin was noted on histopathology.

Conclusions: rTM was effective in attenuating thrombus formation after rewarming from AH. rTM may be a useful anticoagulant during rewarming therapy using ECMO.

HL9-4 The Future of Cardiac Arrest and Resuscitation Science: The Utility of Biobanking and Next-Generation Sequencing

Tomoyoshi Tamura

Emergency and Critical Care Medicine, Keio University School of Medicine

Background: Next-generation sequencing (NGS) accelerates the understanding of pathophysiology and identification of therapeutic targets. While lymphopenia and elevated cytokine levels suggest a role for the systemic immune response after cardiac arrest (CA), little is known about the phenotypes and interactions of immune cells following CA. This study aimed to investigate the immunological network after CA and identify cell states correlating with poor neurological outcomes.

Methods: Peripheral blood mononuclear cells (PBMCs) from 11 post-out-of-hospital CA patients and 3 healthy subjects were analyzed using single-cell RNA-sequencing (scRNA-seq), with validation through flow cytometry, bulk RNA-seq of sorted cell subsets, plasma levels of cytokines, and ex-vivo assay. Good and poor neurological outcomes were defined by 30-day Cerebral Performance Categories 1-2 and 3-5, respectively.

Results: ScRNA-seq analysis of 96,179 cells revealed 6 major cell lineages with several subclusters. Immune cell states diverged as early as 6 hours post-CA between patients with good or poor neurological outcomes 30 days after CA. At 6 hours post-CA, Nectin-2+ monocyte and Tim-3+ natural killer (NK) cell subpopulations were associated with poor outcomes, and interactome analysis highlighted their crosstalk via cytokines and immune checkpoints. In a validation cohort of post-CA patients, flow cytometry confirmed Tim-3+ NK cells and Nectin-2+ monocyte cell states. Bulk RNA-seq analysis of sorted cells reproduced the transcriptomic profile determined by scRNA-seq. Measurement of plasma cytokine levels revealed increased Interferon γ (IFN γ) levels at 6 hours post-CA associated with poor outcomes. Ex vivo studies of PBMCs demonstrated that IFN γ and interleukin-10 induced Nectin-2 on monocytes and Nectin-2 suppressed IFN γ production by NK cells suggesting the immune checkpoint as a compensatory mechanism against inflammation after CA (Tamura T, et al. *Med.* 2023;4:432-456.e6.).

Conclusions: Comprehensive analysis using biobanking and NGS of post-cardiac arrest may contribute to the development of a novel therapeutic approach against post-CA brain injury.

HL10-1 The function of High Density Lipoprotein in patients with sepsis

Tadanaga Shimada

Department of Emergency and Critical Care Medicine, Graduate School of Medicine, Chiba University

Introduction

It is well known that in vivo lipids, especially high density lipoprotein (HDL), are decreased in patients with severe sepsis, and low HDL has been reported to correlate with prognosis and severity of sepsis. It has long been recognized that low HDL is a risk factor for coronary artery disease, and recently it has been reported that low HDL function is a more accurate risk factor for coronary artery disease than low HDL. In the field of sepsis, it has been reported that low HDL could be associated with mortality. However, no analysis in function of HDL has been performed in patients of sepsis. In this study, we analyzed the function of HDL in patients with sepsis.

Methods

We compared HDL function in healthy volunteers (n=39) and sepsis patients (n=38) admitted to the intensive care unit of Chiba University Hospital at the time of admission to the intensive care unit using human clinical samples. The correlation between HDL function and lipoproteins (Apo A1, Apo A2, Apo B, Apo C2, Apo C3, Apo E) was also examined in both groups.

Results

HDL function was significantly decreased in septic patients compared with healthy controls. HDL function was significantly correlated with Apo A1 and Apo C3 in healthy subjects (Apo A1; correlation coefficient 0.675, $p < 0.01$, Apo C3; correlation coefficient 0.350, $p < 0.03$), while HDL function was significantly correlated with Apo C3 in septic patients (HDL function 108.4 U/mL vs 62.9 U/mL, $p < 0.01$, 350, $p < 0.03$), but not Apo A2, Apo B, Apo C2, or Apo E. In contrast, in patients with sepsis, HDL was significantly correlated with HDL. In septic patients, HDL function was significantly correlated with Apo A1 and Apo A2 (Apo A1; correlation coefficient 0.745, $p < 0.01$, Apo A2; correlation coefficient 0.508, $p < 0.01$), but not with Apo B, Apo C or Apo E.

Conclusion.

We found that HDL function was decreased in septic patients at the time of admission to the intensive care unit, and that the correlation with lipoproteins was different from that in healthy subjects. Further investigation is needed to elucidate the mechanism of HDL function decline.

HL10-2 Rapidly progressive brain atrophy in septic ICU patients: A retrospective descriptive study using CT volumetry

Ryuta Nakae

Department of Emergency and Critical Care Medicine, Nippon Medical School Hospital

Background: Sepsis is often associated with multiple organ failure; however, changes in brain volume with sepsis are not well understood. We assessed brain atrophy in the acute phase of sepsis using brain computed tomography (CT) scans, and their findings' relationship to risk factors and outcomes.

Methods: Patients with sepsis admitted to an intensive care unit (ICU) and who underwent at least two head CT scans during hospitalization were included ($n = 48$). The first brain CT scan was routinely performed on admission, and the second and further brain CT scans were obtained whenever prolonged disturbance of consciousness or abnormal neurological findings were observed. Brain volume was estimated using an automatic segmentation method and any changes in brain volume between the two scans were recorded. Patients with a brain volume change $< 0\%$ from the first CT scan to the second CT scan were defined as the "brain atrophy group ($n = 42$)", and those with $\geq 0\%$ were defined as the "no brain atrophy group ($n = 6$)." Use and duration of mechanical ventilation, length of ICU stay, length of hospital stay, and mortality were compared between the groups.

Results: Analysis of all 42 cases in the brain atrophy group showed a significant decrease in brain volume (first CT scan: 1.041 ± 0.123 L vs. second CT scan: 1.002 ± 0.121 L, $t(41) = 9.436$, $p < 0.001$). The mean percentage change in brain volume between CT scans in the brain atrophy group was -3.7% over a median of 31 days, which is equivalent to a brain volume of 38.5 cm^3 . The proportion of cases on mechanical ventilation (95.2% vs. 66.7% ; $p = 0.02$) and median time on mechanical ventilation (28 [IQR: 15–57] days vs. 15 [IQR: 0–25] days, $p = 0.04$) were significantly higher in the brain atrophy group than in the no brain atrophy group.

Conclusions: Many ICU patients with severe sepsis who developed prolonged mental status changes and neurological sequelae showed signs of brain atrophy. Patients with rapidly progressive brain atrophy were more likely to have required mechanical ventilation.

(Nakae R, et al. Crit Care 2021)

November 30 (Thu.) 9 : 50~11 : 05 Room 2 (Tokyo Dome Hotel B1 Grand Ballroom TENKU (North))

HL10-3 Organ Failure and Sepsis Caused by Immune Responses to Stress: Comprehensive Analyses Using Novel Techniques

Takeshi Wada

Division of Acute and Critical Care Medicine, Department of Anesthesiology and Critical Care Medicine,
Hokkaido University Faculty of Medicine

In response to stress, homeostasis is maintained by an optimal balance between inflammatory and anti-inflammatory responses induced by innate and adaptive immunity, respectively. However, multiple organ dysfunction syndrome can develop from an imbalance between these immune responses caused by secondary sepsis or excessive inflammation, leading to poor health outcomes.

Clinically, immunocompetence evaluation of patients is limited to leukocyte counts, fractionation, or morphometrics and less of leukocyte quality or function. Fluorescence flow cytometry is helpful for evaluating antigen expression on cell surfaces but has a limited role in multiple cell surface and intracellular protein expression evaluation due to low accuracy associated with color leakage. Cytometry by time-of-flight (CyTOF) is a mass cytometric and novel immunological tool that can simultaneously analyze more than 40 multi-parameters which can evaluate cell surface antigens, intracellular protein levels such as cytokines, and the extent of phosphorylation at the single-cell level by using metal isotope-labeled antibodies. In addition, LUMINEX® is an assay profiling technology that can simultaneously detect up to 80 cytokines in a sample volume of only 25-50 µl by reacting with LUMINEX® beads coated with antibodies that specifically bind to the target protein.

Our facility has established a joint research system with the Department of Emergency Medicine at Osaka Medical and Pharmaceutical University and has published the following research results in cooperation with the James Lederer Lab at Harvard Medical School.

< Basic research >

- Neutrophil phenotypes implicated in the pathophysiology of post-traumatic sepsis
- Identification of innate immune responses specific to head injuries

< Clinical research >

- Neutrophil dynamics in immune responses to post-cardiac arrest syndrome
- Prolonged enhancement of cytotoxic T lymphocytes in the post-recovery state of severe COVID-19

In this session, we will introduce the above-mentioned research and some of our past research results and look forward to future research.

HL10-4 The effects of BBB permeable Dopamine D1 receptor agonist against sepsis-induced mortality and cognitive impairment

Koichi Tanaka

Ehime Prefectural Central Hospital Advanced Emergency and Critical Care Center

Background:

Sepsis is a life-threatening disease. Of more concern is sepsis-associated encephalopathy (SAE), characterized by diffuse brain dysfunction and accelerated long-term cognitive decline, such as dementia. Multiple factors are involved in the pathogenesis of SAE, in particular neuroinflammation is considered to be one of the most important pathogenic mechanisms. At present, the effective pharmacological treatment against SAE has not been established yet. In present study, we have aim to assess the effects of dopamine D1 receptor (D1R) agonist SKF81297 (SKF) on against cognitive impairment and mortality in murine cecal ligation and puncture (CLP) sepsis model.

Methods:

Male 8–10-week-old C57/BL6 mice were used for the CLP-induced sepsis model. Mice were divided into normal control, CLP with saline and CLP with SKF where SFK or saline were injected just after CLP surgery. Mice were then sacrificed at 6, 12 and 24 hrs after CLP and samples from blood, lung, spleen and brain (hippocampus, and prefrontal cortex) were obtained and assayed for flowcytometry, ELISA and qPCR. In addition to this same cohort mice group were utilized survival assay and cognitive dysfunction assessments with Y-Maze and Morris water maze tests.

Results:

SKF administration showed significant improvements in survival of CLP mice. SKF prevented also CLP induced hypothermia, cognitive dysfunction. In flowcytometry analysis, CLP reduced T-cell, and B-cell and increased Neutrophils which were attenuated by SKF treatment. Based on qPCR and ELISA data, proinflammatory cytokines such as $\text{TNF}\alpha$, IL-6, and IL-1 β in plasma, lung and hippocampus tissues were significantly reduced. More interestingly, CLP increased the number of infiltrated macrophages in brain which prevented by SKF.

Conclusions:

These results suggest that D1R agonist prevent CLP induced both systemic and brain inflammation which improved survival and cognitive dysfunction. Agonists for D1R may be effective for treating SAE.

November 30 (Thu.) 9 : 50~11 : 05 Room 2 (Tokyo Dome Hotel B1 Grand Ballroom TENKU (North))

HL10-5 Alert Cell Strategy: Transcriptional Regulation in Sepsis and Septic Shock from Protein Catabolism and Cell Death

Naoyuki Matsuda

Department of Emergency & Critical Care Medicine, Nagoya University Graduate School of Medicine

[Introduction] Sepsis is a pathophysiological condition in which cell death is accelerated due to infection. In 1992, sepsis was defined as a systemic inflammatory syndrome associated with infection, and associated with cytokine storm. Since 2016, sepsis-3 has been internationally managed as a treatment of organ dysfunction due to infection. When infected with various underlying conditions such as cancer, stroke, acute myocardial infarction, diabetes, and psychiatric diseases, the infection progresses organ dysfunction as a second attack, and there is a risk of transitioning to organization as septic organ failure. In this presentation, I will introduce a science of transcriptional factors, which are the "drug discovery science for sepsis treatment" that our research group is conducting.

[Contents] 1. Regarding the "Staging Theory" that sepsis starts: It is affected by the underlying conditions such as at the normal condition of infection, in the already occurring inflammation, and/or under influence of proliferative cytokines. In addition, the septic response is generally reduced in aging elderly and impaired protein synthesis conditions. 2. On receptor activation: Death receptor activation and "Alert cells" death specifically involved in sepsis are discussed. "Alert cells" are defined as cells that can recognize inflammatory ligands and can produce inflammatory substances while accelerating the cell death. 3. Transcription factor regulation: This time, I will introduce transcription factor regulation of nuclear factor- κ B (NF- κ B), activator protein-1 (AP-1), signal transducer and activator of transcription 3 (STAT-3), and stimulator of interferon genes (STING) that are activated in sepsis and septic cell death. 4. Transcription factor network that forms sepsis pathophysiology: Discuss the activity change between transcription factors by transcription factor knockdown.

[Conclusion] In sepsis, various transcription factors are activated and promote catabolism of proteins and lipids. I will introduce the science that recognizes sepsis in the light of a transcriptome. We will discuss the possibility of novel drug discovery in septic cell injury.

HL11-1 IL-6/STAT3 signaling pathway inhibition for thermal burn-induced skeletal muscle atrophy

Yuko Ono

Department of Disaster and Emergency Medicine, Graduate School of Medicine, Kobe University

Burn injury is the leading cause of death and disability worldwide and places a tremendous economic burden on society. Currently, no pharmacological interventions are available for the treatment of thermal burn-induced skeletal muscle wasting. Elevated levels of inflammatory cytokines, such as interleukin-6 (IL-6), are important hallmarks of severe burn injury. The levels of signal transducer and activator of transcription 3 (STAT3)—a downstream component of IL-6 inflammatory signaling—are elevated with muscle wasting in various pro-catabolic conditions, and STAT3 has been implicated in the regulation of skeletal muscle atrophy. Here, we tested the effects of the STAT3-specific signaling inhibitor C188-9 on thermal burn injury-induced skeletal muscle wasting *in vivo* and on C2C12 myotube atrophy *in vitro* after the administration of plasma from burn model mice. In mice, thermal burn injury severity dependently increased IL-6 in the plasma and tibialis anterior muscles and activated the STAT3 (increased ratio of phospho-STAT3/STAT3) and ubiquitin-proteasome proteolytic pathways (increased Atrogin-1/MAFbx and MuRF1). These effects resulted in skeletal muscle atrophy and reduced grip strength. In murine C2C12 myotubes, plasma from burn mice activated the same inflammatory and proteolytic pathways, leading to myotube atrophy. In mice with burn injury, the intraperitoneal injection of C188-9 (50 mg/kg) reduced activation of the STAT3 and ubiquitin-proteasome proteolytic pathways, reversed skeletal muscle atrophy, and increased grip strength. Similarly, pretreatment of murine C2C12 myotubes with C188-9 (10 μ M) reduced activation of the same inflammatory and proteolytic pathways, and ameliorated myotube atrophy induced by plasma taken from burn model mice. Collectively, these results indicate that pharmacological inhibition of STAT3 signaling may be a novel therapeutic strategy for thermal burn-induced skeletal muscle wasting. (This work was partially supported by grants from the Public Trust Foundation of Marumo ER Medicine and Research Institute. An outline of this contents was published in following paper: Ono Y, et al. *Front Pharmacol.* 2022;13:1031906.)

November 30 (Thu.) 14 : 20~15 : 20 Room 2 (Tokyo Dome Hotel B1 Grand Ballroom TENKU (North))

HL11-2 Basic research for the development of REBOA catheters to enable prolonged field care in the battlefield

Nobuaki Kiriu

Division of Traumatology, Research Institute, National Defense Medical College

In order to save the life of a severely injured patient who has suffered hemorrhagic shock due to an explosion or gunshot wound on the battlefield, it is essential to transport the patient to a field hospital where definitive therapy can be available as fast as possible. To temporarily control such massive hemorrhage, the Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) catheter is currently used even in routine trauma care in general trauma centers in Japan, but it is possible to use for only about 40 minutes. Any longer than that would result in a state of cardiac failure due to the increased afterload associated with the interruption of blood circulation in the aorta, and there is a high risk of loss of life due to the effects of REBOA use itself. However, the actual transport time data showed that it took 75 minutes for the US military in Afghanistan, which means that a patient with hemorrhagic shock would be lost before reaching a field hospital. Therefore, we are conducting fundamental research to develop a REBOA catheter that can extend the transport time as much as possible and allow patients to be transported to a field hospital in a condition where definitive therapy is available.

We are using a hemorrhagic shock model using pigs weighing approximately 40 kg under general anesthesia which are phlebotomized with 25% of their circulating blood volume. In the control group, in which regular REBOA catheters were used for 90 minutes after phlebotomy, seven out of eight pigs so far fell into cardiac arrest within minutes after deflation of the REBOA catheter.

Therefore, we are studying the use of blood flow bypass and drugs to reduce the cardiac afterload associated with the REBOA catheter use and to improve the shape of the REBOA catheter itself to extend its use time.

We will present the current status and future prospects of our research.

HL11-3 New Heat Stroke Prevention Strategies Based on the Effects of Pituitary Adenylate Cyclase Activating Polypeptide (PACAP)

Keisuke Suzuki

Department of Emergency and Disaster Medicine, Showa University School of Medicine

While the human body's temperature is maintained at 36.5°C through a balance between heat production and heat dissipation, heat stroke patients often exceed 40°C due to decrease heat dissipation caused by rising ambient temperature. Pituitary adenylate cyclase-activating polypeptide (PACAP) has recently emerged as a potential regulator of body temperature, but its role in heat stroke remains unclear. Therefore, this study investigated the effects of heat exposure in PACAP gene-deficient knockout (KO) mice. We previously established an animal model for inducing heat stroke using a specially constructed chamber [1]. The mice were mildly dehydrated, followed by exposure to an ambient temperature of 36°C and 99% relative humidity for 150 min. We first examined the survival rate and deep body temperature. Samples were collected immediately after 60 min of exposure under the same conditions. The survival rate after 150 min of heat exposure was 80% in PACAP KO mice (n=10) and 20% in wild-type mice (n=10) ($p < 0.05$). PACAP KO mice exhibited a significantly slower increase in body temperature, taking longer to reach a maximum of 42°C. Blood tests and histological evaluation conducted immediately after heat exposure showed a significant reduction in organ damage, in PACAP KO mice compared to wild-type mice. In addition, gene expression analysis revealed a significant decrease in c-fos expression in the ventral medial preoptic area of the hypothalamus, which contain thermosensitive neurons, in PACAP KO mice compared to wild-type mice. Differences were also observed in brown adipose tissue, a major site of heat production [2]. These results suggest that PACAP KO mice are thermotolerant, possibly due to reduced heat production. This important finding suggests a new heat stroke strategy that targets heat production instead of relying on heat dissipation via air conditioning.

1. Miyamoto, K., et al., A novel mouse model of heatstroke accounting for ambient temperature and relative humidity. *J Intensive Care*, 2021. 9(1): p. 35.

2. Suzuki, K., et al., Effect of PACAP on Heat Exposure. *Int J Mol Sci*, 2023. 24(4).

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November 30 (Thu.) 14 : 20~15 : 20 Room 2 (Tokyo Dome Hotel B1 Grand Ballroom TENKU (North))

HL11-4 A Study on Stable Allograft Transport for Frozen Allogeneic Skin Grafting for Extensive Severe Burns

Hiroto Ikeda

Japan Skin Bank Network

Purpose: Frozen allogeneic skin grafting for extensive severe burns is useful for life-saving treatment of patients. The Japan Skin Bank Network is the only tissue bank in Japan that stores and supplies frozen allogeneic skin, and has established a network of 80 burn treatment facilities nationwide. In this study, we monitored the temperature in a dry shipper and examined the effects of distance, transport time, season, and other factors on the ability of any facility in Japan to transport frozen allogeneic skin at a constant ultra-low temperature and supply safe and highly viable skin until transplantation.

Methods: A temperature recording sensor was attached to a tank filled with liquid nitrogen for transportation (dry shipper), samples were transported, and temperature changes were recorded until the tank was returned. Test transfers were conducted at seven locations (Okinawa, Kyushu, Shikoku, Tokai, Kanto, Tohoku, and Hokkaido) during two seasons, winter and summer.

Results: The maximum range of temperature fluctuation outside the warehouse was 14.2°C (summer: Okinawa Prefecture) and 25.0°C (winter: Hokkaido), depending on the region and seasonality, which may be due to differences in outside temperature and temperature inside the facility during transport. The temperature was maintained at an average of -194.8 to -196.1°C without any regional or seasonal influence.

Conclusion: In all regions surveyed, there was little influence from seasonal and regional differences, and it was confirmed that the quality of the product was maintained. It can be judged that cryopreserved skin can be delivered without problems using the current transportation method.

In addition, we report on the current activities of the Japan Skin Bank Network based on the results of the above study.

HL12-1 Basic research on artificial hibernation therapy for sepsis

Yutaka Kondo

Juntendo University Urayasu Hospital

The artificial hibernation therapy is a treatment option that artificially induces extreme metabolic suppression in organ and tissues, allowing for long-term survival. The effectiveness of artificial hibernation therapy for sepsis is still uncertain, but it holds potential due to its organ-protective effects. In this study, we examined the possibility of artificial hibernation therapy for sepsis through animal or cell experiments. In healthy mice, intraperitoneal administration of adenosine 5'-monophosphate (AMP) induced hypothermia and bradycardia immediately after administration. Furthermore, administration of AMP to a hypoxia model mouse confirmed an extension in survival time and an increase in resistance to tissue hypoxia. In cell experiments using cultured brain neurons, a decrease in intracellular calcium concentration and inhibition of mitochondrial function were observed with AMP administration. The main problem of artificial hibernation therapy for sepsis is hypothermia, which can potentially worsen the prognosis of sepsis. On contrast, the therapeutic effects of this therapy are not solely attributed to the hypothermic effects. We investigated the potential of artificial hibernation therapy for sepsis using AMP.

November 30 (Thu.) 15 : 30~16 : 30 Room 2 (Tokyo Dome Hotel B1 Grand Ballroom TENKU (North))

HL12-2 Past, Present, and Future of Foreign Body Airway Obstruction Research in the World

Tatsuya Norii

University of New Mexico, School of Medicine, Department of Emergency Medicine

Foreign body airway obstruction (FBAO) from food has been a long-standing threat to human beings ever since the evolution of the human larynx, which endowed us with the ability to speak. Despite being a leading cause of accidental death worldwide, advances in FBAO research had stalled until recently. One of the biggest challenges in FBAO research is the lack of high-quality data sources available to resuscitation researchers.

To overcome these challenges, we formed a multidisciplinary, international research group called MOCHI (Multi-center Observational CHoking Investigation) in 2018. The group comprises researchers with diverse backgrounds, including emergency medicine, critical care, prehospital medicine, and data science. Initially, the group collected retrospective data and established an FBAO classification system based on this data. Analysis of the datasets uncovered several important facts, including the finding that a target time of 4 minutes or less for foreign body removal may help prevent a vegetative state or death. The retrospective dataset also included FBAO cases with unique circumstances, leading to a study that demonstrated the successful removal of foreign bodies in approximately one-third of patients with FBAO through the use of a vacuum cleaner. Other datasets and experiments provided further insights into FBAO. For instance, a recent analysis of the Japan Council for Quality Health Care database for in-hospital FBAO cases revealed that effective interventions were infrequently performed even within the hospital setting, resulting in a high number of fatalities. This highlights the challenges associated with delivering effective interventions.

To collect data that are difficult to gather retrospectively, such as bystander characteristics, efforts made to remove foreign bodies, and outcomes, we initiated a nationwide, multicenter prospective cohort study of patients with FBAO in 2020 and we are currently analyzing the data. In conclusion, despite the challenges, there have been significant recent advances in FBAO research, and we hope that these advancements will contribute to updating guidelines and making eating safer than ever.

HL12-3 Web-based training using simulation software for nuclear disaster response with avatars in a virtual space

Keita Iyama

Acute and Critical Care Center, Nagasaki University Hospital

BACKGROUND

The intention to work in specific hazards is low. Lack of confidence is one of the reasons to avoid working in specific hazards, therefore sufficient education is needed. More than 10 years have passed since the Fukushima Daiichi Nuclear Power Plant (NPP) accident and the perception of the accident is becoming a past thing. Therefore, it is an essential mission to develop the next generation of human resources. However, in recent years, it has become difficult to hold a face-to-face training due to COVID-19, and the educational opportunity has lost. Hence, we have developed simulation software for disaster response, and developed a web-based training method.

METHODS

After a classroom lecture on initial response to specific disasters, we conducted a practical training using our 3D and VR versions of the simulation software for 9 master's course students. In the VR version, participants wore a headset and operated a controller to respond to injured victims in NPP in the metaverse. After the training, a questionnaire survey was conducted.

RESULTS

Both the 3D and VR versions of the software were easy to operate, and the satisfaction with the web-based training was high. On the other hand, it became clear that desk exercises and practical training conducted face-to-face can be partially but not completely substituted.

DISCUSSION

The 3D and VR versions have their own advantages and disadvantages in terms of what can be learned. Moreover, not all the actual desk exercises and practical training can be replaced by the web-based training, and the limitations of the web-based training became clear. It is difficult to provide hands-on experience in preparing or using equipment on the web. On the other hand, in a special environment such as NPP, where environmental radiation levels are high, it is difficult to hold a face-to-face training in terms of health and safety management. Simulated experience of activities in such a situation using a VR version may facilitate activities during an actual disaster.

CONCLUSION

We hope that with education using simulation software, more disaster responders will become more confident in dealing with specific disasters.

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HL12-4 Efficacy of Body Armor in Protection against Blast Injuries using a Swine Model in a Confined Space with a Blast Tube

Yasumasa Sekine

Dept. of Traumatology and Critical Care Medicine, National Defense Medical College (NDMC),

The purpose of this study was to clarify whether or not body armor would protect the body of a swine model using a blast tube built at National Defense Medical College, which is the first such blast tube in Japan. Seventeen pigs were divided into two groups: the body armor group and the non-body armor group. Under intravenous anesthesia, the pigs were tightly fixed in the left lateral position on a table and exposed from the back neck to the upper lumbar back to the blast wave and wind with or without body armor, with the driving pressure of the blast tube set to 3.0 MPa. When the surviving and dead pigs were compared, blood gas analyses revealed significant differences in PaO₂, PaCO₂, and pH in the super-early phase. All pigs injured by the blast wave and wind had lung hemorrhage. All 6 animals in the body armor group and 6 of the 11 animals in the control group survived for 3 hours after injury. Respiratory arrest immediately after exposure to the blast wave was considered to influence the mortality in our pig model. Body armor may have a beneficial effect in protecting against respiratory arrest immediately after an explosion.

November 30 (Thu.) 9:40~11:40 Room 1 (Tokyo Dome City Theatre G-ROSSO)

EMS-1 Digital Transformation of EMS Asia: The “Safe-Yunlin” Digital Health Network with Information Communication Technology and Service Innovation to Help Emergency Care in Taiwan

Matthew Huei-Ming Ma

Professor of Emergency Medicine at National Taiwan University, Superintendent of National Taiwan University Hospital, Yunlin Branch, Taiwan

Despite the implementation of National Health Insurance in the 1990s, there are still significant urban-rural disparities among equality, access and quality of health care in Taiwan. Recognizing the unique environment and opportunities of developing digital and tele-health in Yunlin County, National Taiwan University Hospital Yunlin Branch established its ‘Center of Telemedicine’ in April 2017 to achieve the goal of developing Yunlin into the model city of telemedicine implementation in Taiwan. Since 2018, the ‘Safe-Yunlin’ Digital Health Network has been initiated that successfully connected dozens of hospitals, clinics, and long-term care facilities. Novel pilot projects that combined information communication technology (ICT) and service innovation were proposed and implemented to address the unmet acute healthcare needs from the low-resourced areas.

The revolutionary ‘Twin-Star Regional Collaboration’ program broke the silos between emergency departments from different understaffed hospitals, and created joint acute care staffing and digital services via telemedicine. In this twin-star project, NTU Hospital YUNLIN collaborated with a near-by hospital. When one hospital is in shortage of a particular specialty, for example plastic and neurosurgery in Yunlin, tele-consultation is provided through telemedicine. As the two hospitals are not far from each other, the specialty service from the other side could be provided both virtually and physically.

The successful model of Telemedicine-facilitated regional collaboration have been dissected into four operable elements, and currently undergoing scaling up and replication in 14 other low-resourced areas in Taiwan. With 14 leading coordinating tertiary center and over 70 participating hospitals of smaller scales and some remote health station collaborating under the digital alliance model.

Ultimately, the majority of acute patients could stay at nearby hospital receiving needed care strengthened and provided through the intricate regional digital alliance, and those life-threatening and time-sensitive patients could get expedited definitive care.

The ‘Safe-Yunlin’ Digital Health Network addressed the unmet health needs, and liaised with the key policy, industry and healthcare stakeholders, forming a strong and productive partnership.

Keywords : Digital Health, Telemedicine, Universal Health Coverage, Information Communication Technology, Emergency Care

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EMS-2 New Strategy of Cardiopulmonary Resuscitation Training: Virtual Plus Training

Sang Do Shin

Professor, Department of Emergency Medicine, Seoul National University College of Medicine and Hospital, Korea

Emergency medical services (EMS) is the science of prehospital care for critically ill patients. Pre-hospital care is provided by professional providers such as EMS doctors, paramedics, nurses and emergency medical technicians, as well as by the general public and bystanders. In cardiopulmonary resuscitation (CPR), community providers such as bystanders and first responders play a very important role in treating patients and improving outcomes.

Prior to the COVID-19 pandemic, most CPR training for the general public was simulation training. Classroom training and in-person experiences were delivered in training centers designed in each community. Professional instructors conducted CPR training using various materials, from low-fidelity mannequins to high-fidelity mannequins. Due to the pandemic, gatherings of people have been banned and health authorities have made regulations related to social distancing. During this time, online communication, conference, and CPR training have become popular ways. Virtual CPR training was introduced in this period. Effectiveness and safety as an alternative or compensatory method to standard training was compared in many studies.

Since the pandemic, we are now seeing technological advances in training using Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR). In this presentation, I will talk about virtual CPR training strategy (Virtual Plus Training). The concept, content, technical background, potential advantages and limitations of Virtual Plus Training, and future directions will be presented.

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EMS-3 The Future of Emergency Medicine Using Technology -The Challenge of Smart119, a National University Startup in Japan-

Taka-aki Nakada

Professor of Emergency and Critical Care Medicine, Chiba University Graduate School of Medicine / CEO, Smart119 Inc.

In Japan, the number of EMS requests is increasing every year. On the other hand, the number of EMS providers has not increased correspondingly. As a result, the burden on EMS providers is increasing. The arrival time from the EMS call to the scene and to the hospital has been extended, creating issues in providing emergency medical care to patients. Information is passed from the patient to the EMS dispatcher, EMS provider, and hospital healthcare staff one by one in an analog manner, which does not achieve sufficient and accurate information transfer, prevents smooth acceptance by medical facilities, and leads to difficult transport cases. In addition, the analog transmission of information results in a lot of manual work. We have developed a futuristic emergency information system that solves these problems using original and flexible ideas and the latest technology. We have developed a new emergency information system that centralizes digital information from analog messages to a central location, where EMS providers can digitally input information using a tablet PC or smart phone. The system also utilizes voice recognition and data linkage with patient monitors to simplify digital input. The accepting medical institution can quickly check the on-site information and accept the patient using a tablet PC or smart phone. EMS providers are required to prepare multiple reports, including regional and national reports, but once entered, digital data is automatically reflected in multiple reports, reducing the workload. In addition to this function, EMS providers can use AI prediction of the frequency of EMS requests based on past EMS request data to optimize the use of ambulances, which is actually being implemented in Kawasaki City. Using data collected by emergency services, the Smart119 Inc. has also developed an algorithm for predicting stroke and acute myocardial infarction during prehospital settings, which has been published in a paper and will soon be introduced in the field. The Smart119 emergency information system has already been introduced in several regions in Japan, and we hope to spread this system in Japan and abroad to reduce the workload and save more patients in the future.

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EMS-4 An Overview of Future technologies for EMS

Yih Yng Ng

Director at the Digital and Smart Health Office and the Deputy Clinical Director,
Ng Teng Fong Centre for Healthcare Innovation, Singapore

COVID had posed many challenges to Emergency medical services (EMS) such as huge demand surges, staff shortages and operational constraints, hampering the performance and outcomes of EMS in most countries.

Many EMS systems have responded to address some of these challenges to deliver care during these difficult times. This talk will review some of the smart technologies that are transforming healthcare, such as 5G, cloud, AI, and medical IoTs, and how they are applied in EMS scenarios.

The talk will also discuss the benefits and limitations of these technologies, as well as the future directions and opportunities for innovation in EMS.

EMS-5 D1669: The Digital Transformation for Emergency Care Innovation in Thailand

Flt.Lt. Atchariya Pangma

Secretary-General of the National Institute for Emergency Medicine, Thailand

The coronavirus pandemic has accelerated rapid shift towards new trends and transformations of emergency care delivery through greater adoption of digital technologies in healthcare innovation. Amid present and potential socio-economic uncertainties, emergency care can utilize capacities of digital transformation as a way to accommodate patients' need and enhance quality of care while simultaneously adapting operations, protocols and culture.

The emergency medical service system of Thailand has highlighted the significance of its adaptive capacities towards digital era. D1669 or Digital 1669 is a data-driven EMS system introduced to address choices for greater services. It redesigns the delivery of emergency care by having access to a patient's salient clinical information. It redesigns personal emergency conversations or communication flow through a Total Conversation System through utilization of Communication Information System (CIS) which operationalize the exchange of information with the real-time display during all phases of operations. A case management system (Operation Information System) improves workflows with standardized protocols, redesign the dispatching process, and revise EMS resource optimization and allocation according to patient's medical condition. Emergency Medical Directors are encouraged to use Medical Information System (MIS) designed to enhance medical directors' perspective and integrate patient's health records from heterogeneous databases in different proprietary formats from medical devices in the ambulance, while Public Information System (PIS) is designed for the citizen to receive alerts from the EMS system in order to be aware of incidents. D1669 is the Enterprise Architecture for Emergency Medical Service in the Digital Age to deliver appropriate medical care in transit until transferring patient to definitive care and acts as a blueprint to enable data integration from existing related databases through Information Exchange Model and the Data References with the international Standards.

At the current stage, several provincial emergency medical direction agencies in Thailand have decided to accept compulsory of changes and transformation by installing D1669, and many other agencies are on their ways to embrace the changes. While digital transformation journey is long and means something different to every health system, recognizing digital transformation is an enterprise investment essential to improving health care delivery in the post-pandemic era.

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WINFOCUS-1 (Introduction) Introduction: POCUS framework based on ABC approach

Toru Kameda

Department of Ultrasound Medicine, Saiseikai Utsunomiya Hospital

“Clinical Guidance for Emergency and Point-of-Care Ultrasonography” was established with the endorsement of Japanese Association for Acute Medicine (JAAM) in 2022. In the guideline, we have introduced a basic POCUS framework based on the systematic airway, breathing, and circulation (ABC) approach for the initial management of shock and dyspnea (Acute Med Surg. 2020; 7: e481). Emergency and critical care physicians have many opportunities to encounter trauma or non-trauma patients with shock, dyspnea, or both. The POCUS applications in this framework are powerful techniques for evaluating life-threatening diseases and injuries in patients with shock or dyspnea. In general, one or several POCUS applications can be selected from the framework according to the clinical presentation. In patients with undifferentiated shock, dyspnea, or both, the framework can be used as a protocol or algorithm.

	Shock/Hypotension	Dyspnea
Airway	Airway ultrasound Confirmation of endotracheal intubation Identification of the cricoid membrane for cricothyrotomy	
Breathing	Lung ultrasound Pneumothorax Hemothorax, Pleural effusion, Empyema (sepsis), Drainage Pulmonary edema	
Circulation	Focused cardiac ultrasound Pericardial effusion/Cardiac tamponade, Drainage Left ventricular systolic function (hypokinesia, hyperkinesia) Right ventricular dilatation/Systolic dysfunction IVC diameter and collapsibility	
	Abdominal ultrasound Hemoperitoneum Abdominal aortic aneurysm Hydronephrosis (sepsis) Acute cholecystitis (sepsis)	
	Leg-vein compression ultrasound Deep venous thrombosis (pulmonary embolism)	
	Ultrasound-guided vascular access Intravenous line placement, REBOA, ECMO	

WINFOCUS-2 Role of airway ultrasound in dyspnea patients

Adi B. Osman

Senior Consultant Emergency Physician and ED / Critical Care in Hospital Raja Permaisuri Bainun, Ipoh, Malaysia

Upper airway ultrasound is a valuable, non-invasive, simple, and portable point of care ultrasound (POCUS) for evaluation of airway management even in anatomy distorted by pathology or trauma. Ultrasound enables us to identify important sonoanatomy of the upper airway such as thyroid cartilage, epiglottis, cricoid cartilage, cricothyroid membrane, tracheal cartilages, and esophagus. Understanding this applied sonoanatomy facilitates clinician to use ultrasound in assessment of airway anatomy for difficult intubation, ETT and LMA placement and depth, assessment of airway size, ultrasound-guided invasive procedures such as percutaneous needle cricothyroidotomy and tracheostomy, prediction of postextubation stridor and left double-lumen bronchial tube size, and detecting upper airway pathologies. Widespread POCUS awareness, better technological advancements, portability, and availability of ultrasound in most critical areas facilitate upper airway ultrasound to become the potential first-line non-invasive airway assessment tool in the future.

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WINFOCUS-3 The present and perspective of Lung POCUS for respiratory failure in Japan

Hayato Taniguchi

Yokohama City University Medical Center Advanced Critical Care Center

During the outbreak of COVID-19, all patients complaining of dyspnea were transported to emergency medical facilities that were able to handle the disease. Although CT is useful in diagnosing COVID-19, it is not indicated for all cases. On the other hand, POCUS has been suggested to be useful because it can rapidly and noninvasively identify conditions that cause respiratory failure at the bedside.

Lung POCUS has been increasingly useful in the past and present, and we are currently working on two projects for its future. The first is an attempt to educate and implement Lung POCUS as an assessment tool, not by physicians, but by nurses as a physical examination. The second is the invention of a method to assess lung parenchymal elasticity. In patients with respiratory failure requiring intubation, prolonged duration of ventilation leads to lung fibrosis. Although pulmonary elasticity is conventionally evaluated by CT, a simple and repeatable bedside examination method is desirable. The method which was invented by our team may be used to assess parenchymal elasticity, which may be used to determine the timing and limits of ECMO.

Although the above efforts have only just begun, 25 years after Lichtenstein's Lung POCUS was recognized, we would like to present what we can now do with Lung POCUS and what we should do in the future.

WINFOCUS-4 “A leap from the basics to Echodynamics”

Gabriele Via

Senior Consultant Cardiac Anesthesia and Intensive Care Istituto Cardiocentro Ticino, Lugano, SWITZERLAND

Focused Cardiac Ultrasound is a well-established acute care clinician-performed diagnostic and patient management imaging modality. Utilizing a simplified, goal-oriented, qualitative, priority-based approach provides the essential information for the first approach to shock, cardiac arrest and respiratory failure. Once the first understanding of the underpinning pathophysiology has been achieved, the need to provide an etiological diagnosis and monitor the disease course and the ongoing treatment response requires point-of-care ultrasound skills and technique beyond FoCUS competency. The use of Doppler Ultrasound and of a more quantitative cardiac ultrasound approach, although still limited in comparison to comprehensive echocardiography, allows the assessment of the main hemodynamic variables: cardiac contractility and cardiac output, fluid responsiveness, intracardiac pressures, the degree of systemic venous congestion.

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WINFOCUS-5 Advanced Echocardiography

Arif Hussain

Head of Cardiac Critical Care, Heart and Lung Transplant Intensive Care and a consultant Cardiothoracic Anesthesiologist at King Abdulaziz Medical City, Riyadh, Saudi Arabia

Advanced echocardiography by implication is a specialized area of imaging that falls within the domain of cardiology. However, some skills that can be acquired easily after mastering the very basic point of care echocardiography, known as FoCUS (Focused Cardiac Ultrasound). They may be added to the basic examination that addresses the bedside valuation of a sick patient in the emergency department or intensive care units. These echocardiographic modalities may also be applicable to the more stable patients in the medical wards or even clinics. In my presentation I will introduce the use of Doppler echocardiography and discuss how it can help determine cardiac output, gross valvular pathology including stenotic and regurgitant lesions, assessment of volume status and volume responsiveness, assessment and impact of pulmonary arterial pressures and basic diastolic function. I will touch upon some disease processes that cause myocardial dysfunction and hemodynamic instability including pulmonary embolism, sepsis and ARDS. The learning objectives will be to provide basic tools to a non-cardiologist clinician to evaluate the hemodynamics that can help manage the patient better.

WINFOCUS-6 Abdominal POCUS for the assessment of shock: When and what?

Young-Rock,Ha

Critical Care Medicine, Seongnam Citizens Medical Center, Seongnam, Korea

It is widely known that performing POCUS immediately after the physical examination in shock patients can lead to rapid differential diagnosis and appropriate treatment.

Although the focus of this presentation is on abdominal ultrasound, the presenter suggests starting with a lung ultrasound for all shock patients. Performing lung - inferior vena cava (IVC) - cardiac ultrasound before proceeding to abdominal ultrasound is considered the most reasonable approach.

By using lung ultrasound, it is possible to first determine if the cause of shock is tension pneumothorax. In cases of an A-pattern, fluid therapy should be prioritized. If the IVC is flat, there is a higher possibility of hypovolemic or distributive shock. If the IVC appears fat, the likelihood of obstructive shock or cardiogenic shock is higher. Subsequently, cardiac ultrasound can be used to confirm whether it is hypovolemic, cardiogenic, or obstructive shock.

In cases of hypovolemic or distributive shock (especially septic shock), it is deemed appropriate to perform abdominal ultrasound to identify the source of bleeding or septic focus. This can help in identifying various causes such as AAA, intraperitoneal hematoma, retroperitoneal hematoma, biliary obstruction, urinary obstruction, and others.

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WINFOCUS-7 Multiorgan Point of Care Ultrasound in suspected pulmonary embolism

Peiman Nazerian

Vice-director of the Emergency Department (ED), Careggi University Hospital, Firenze, Italy

Pulmonary embolism (PE) is a heterogeneous condition that should be always suspected in patients with dyspnea. Presenting signs and symptoms of PE are nonspecific, favoring a large use of second-line diagnostic tests such as multidetector CT pulmonary angiography (MCTPA), thus exposing patients to high-dose radiation and to potential serious complications, furthermore not all patients can undergo MCTPA. Point-of-care ultrasound (POCUS) can be rapidly performed at the bedside and is complementary to the physical examination; it should be considered as a focused diagnostic test that adds anatomic, functional, and physiologic information to the care of the emergent patients. Many authors evaluated the diagnostic role of ultrasonography in patients with suspected PE, focusing on subpleural infarcts investigated by lung ultrasonography, right ventricular dilatation/dysfunction by heart ultrasonography and deep vein thrombosis by leg vein ultrasonography. However, due to the relatively low sensitivity, not one of these ultrasonographic methods can be safely used to rule out PE as a standalone test. Multiorgan ultrasonography is more sensitive than single-organ ultrasonography, increases the accuracy of clinical pretest probability estimation in patients with suspected PE, and may safely reduce the MCTPA burden.