ESTI

European Society of Thoracic Imaging

ESTI WINTER COURSE 2022

December 8-10, 2022

REYKJAVIK, ICELAND

FINAL PROGRAMME

WELCOME WORDS

Dear colleagues & friends,

Return of the on-site ESTI Winter Course

Welcome to the „traditional" onsite ESTI Winter Course. The course programme will focus on elements from the level 3 chest radiology curriculum from the ESR. This includes diseases of the great vessels, infections, malignancies in pleura, mediastinum and lungs, interstitial lungs diseases, nodules management and lung cancer screening, intervention, trauma, PET-CT and MRI of the lungs.

The course is meant to help candidates interested in sitting the ESTI diploma examination as well as serve as a solid repetition for experienced chest radiologists looking to refresh their knowledge in chest radiology. We have added some case/quiz presentations, which will be interactive.

We hope that this format will be educational and further the interest in chest/thoracic radiology in both, young and mature radiologists.

Welcome to Reykjavik!

Anagha P. Parkar
ESTI Winter Course 2022 Organiser

ESTI WINTER COURSE 2022 FACULTY

G. Aviram, Tel Aviv/IL
J. Biederer, Heidelberg/DE
G. Chassagnon, Paris/FR
T. Franquet, Barcelona/ES
T. Frauenfelder, Zurich/CH
F. Gleeson, Oxford/UK
I. Hartmann, Rotterdam/NL
A.R. Larici, Rome/IT
A. Oikonomou, Toronto/CA
A.P. Parkar, Bergen/NO
M. Prokop, Nijmegen/NL
H. Prosch, Vienna/AT
M-P. Revel, Paris/FR
C. Schaefer-Prokop, Amersfoort/NL
A. Snoeckx, Edegem/BE

GALIT AVIRAM, TEL AVIV/IL

- Professor of Diagnostic Radiology, chair of Imaging Section, Tel Aviv University Sackler School of Medicine
- Head of Cardiothoracic Imaging Unit in Tel Aviv Sourasky Medical Center
- Graduated from Sackler School of Medicine, Tel Aviv, Israel
- Clinical fellowships in Chest Imaging, University of Western Ontario Canada, and Cardiothoracic Imaging, University of Miami
- Published around 100 articles in peer reviewed scientific journals, 70 original articles, 30 review or case reports
- Research main area-pulmonary embolism, the cardiothoracic unit
- Member editorial boards of The Journal of Thoracic Imaging (2010-date) and of CHEST (2012-2019)

JÜRGEN BIEDERER, HEIDELBERG/DE

Education

Medical School at Christian-Albrechts-University, Kiel (1989-1995), MD at Kiel (1995), Dr. med. at Kiel (1996), Habilitation at Christian-Albrechts-University, Kiel (2003)

Professional Career

2012-today	UH Heidelberg, Department of diagnostic and interventional Radiology
2020-today	Head of Radiology, Regional Hospital Bergstrasse/UH Heidelberg
2017-today	Visiting professor, Faculty of Medicine/University of Latvia, Riga
2007-today	Associate Professor of the Faculty of Medicine/CAU Kiel
2012-today	Pulmonary imaging researcher/PI (TLRC-Translational Lung Research Center Heidelberg; DZL-German Lung Research Center)
2014-2019	Head of Radiology in Groß Gerau County Hospital (private practice)
2012-2014	Head of the section Pulmonary Radiology and head of the Division Imaging in the Department of Internal Medicine, University Hospital Heidelberg
2007-2012	Vice Director of the Department of Diagnostic Radiology in Kiel
2005-2006	Fellowship in the Department of Radiology at German Cancer Research Center (DKFZ) of the Helmholtz Society (Heidelberg)
1997-2005	Residency and Fellowship at the Department of Diagnostic Radiology at University Hospital Kiel
1995-1996	Residency in Neurosurgery at Paracelsus-Klinik Osnabrück

Selected Publications

- Biederer J, Heussel CP, Puderbach M, Wielpuetz MO (2014) Functional magnetic resonance imaging of the lung. Semin Respir Crit Care Med 35:74–82
- Biederer J, Ohno Y, Hatabu H, Schiebler ML, van Beek EJR, Vogel-Claussen J, Kauczor H-U (2020): „Screening for lung cancer: Does MRI have a role?" [European Journal of Radiology 86 (2017) 353-360]. Eur J Radiol 125: 108896
- Sodhi KS, Ciet P, Vasanawala S, Biederer J (2021): Practical protocol for lung magnetic resonance imaging and common clinical indications. Pediatr Radiol. 26:1–17. doi: 10.1007/s00247-021-05090-z.
- Karch A, Vogelmeier C, Welte T, Bals R, Kauczor H-U, Biederer J et al. (2016) The German COPD cohort COSYCONET: Aims, methods and descriptive analysis of the study population at baseline. Respir Med 114:27–37
- Vogel-Claussen J, Ley-Zaporozhan J, Agarwal P, Biederer J, Kauczor H-U, Ley S, Kühl H, Mueller-Lisse UG, Persigehl T, Schlett CL, et al. (2020): Recommendations of the Thoracic Imaging Section of the German Radiological Society for clinical application of chest imaging and structured CT reporting in the COVID-19 pandemic. RöFo – Fortschritte Röntgenstr a-1174-837

GUILLAUME CHASSAGNON, PARIS/FR

Current Position

Associate professor at Cochin Hospital, Paris

Education

2015-2019	PhD degree, CentraleSupelec, Paris Saclay University, France
2016	Medical Doctor degree – with honors, Francois Rabelais University, Tours/France, Specialty: Radiology
2015	Master's degree – with honors, BioMedical Engineering (BME-Paris) – BioImaging track, Paris Descartes University, Paris/France
2002-2010	Medical school at Pitié-Salpêtrière - University of Paris VI, Paris/France

Five main Publications

- Campredon A, Battistella E, Martin C, Durieu I, Mely L, Marguet C, Belleguic C, Murris M, Chiron R, Fanton A, Bui S, Reynaud-Gaubert M, Reix Philippe; Hoang-Thi TN; Vakalopoulou M, Revel MP, Da Silva J, Burgel PR, Chassagnon G. Using chest CT scan and unsupervised machine learning for predicting and evaluating response to lumacaftor-ivacaftor in people with cystic fibrosis. Eur Respir J. 2022
- Revel MP, Boussouar S, de Margerie-Mellon C, Saab I, Lapotre T, Mompoint D, Chassagnon G et al. Study of Thoracic CT in COVID-19: The STOIC Project. Radiology. 2021 Oct;301(1):E361-E370.
- Chassagnon G, Vakalopoulou M, Régent A, Sahasrabudhe M, Marini R, et al. Elastic Registration-driven Deep Learning for Longitudinal Assessment of Systemic Sclerosis Interstitial Lung Disease at CT. Radiology. 2021 Jan;298(1):189-198.
- Chassagnon G, Vakalopoulou M, Battistella E, Christodoulidis S, Hoang-Thi TN et al. AI-driven quantification, staging and outcome prediction of COVID-19 pneumonia. Med Image Anal. 2021 Jan;67:101860.
- Chassagnon G, Martin C, Marini C, Vakalopoulou M, Régent A et al. Use of Elastic Registration in Pulmonary MRI for the assessment of Pulmonary Fibrosis in Systemic Sclerosis patients, Radiology 2019;291(2):487-492.

Patent

Chassagnon G, Revel MP, Rene A, Chemouny S: « Algorithme de scoring automatique des lésions tomodensitométriques thoraciques dans la mucoviscidose ». PCT/EP2017/075246

TOMÁS FRANQUET, BARCELONA/ES

Education

M.D. University of Navarra, Pamplona, Spain, I976
Ph.D. Pathologic-radiologic correlation of epithelial metastases to bone. Histomorphometric analysis. Cum Laude
Residency: 1980-84 Radiology University Clinic, Pamplona. Fellowship in Thoracic Imaging (Dr Nestor L. Müller): 2002 Vancouver General Hospital
Associated Professor of Radiology (1996-2014) in the Universitat Autónoma de Barcelona, Member of the Fleischner Society (2006-), Member of RSNA (Radiological Society of North America), STR (Society of Thoracic Radiology), ESTI (European Society of Thoracic Imaging), ARRS (American Roentgen Ray Society) and SERAM (Sociedad Española de Radiología Médica), Sociedad Española de Imagen Cardio-Torácica (SEICAT)

Past-President – 2010 SEICAT (Sociedad Española de Radiología Cardiotorácica)
Past-President – 2015 ESTI (European Society of Thoracic Imaging)
Honorary Member: ESTI (European Society of Thoracic Imaging), BSTI (British Society of Thoracic Imaging), SEICAT (Sociedad Española de Imagen Cardio-Torácica)

Director of the Section of Thoracic Radiology. Hospital de Sant Pau, Barcelona (Spain)

Research Grants

European Association of Radiology (EAR) Research Grant (ECR 2002) Research Fellowship (2002) Research Project "Diagnostic accuracy of gadolinium-enhanced MR angiography vs. contrast- enhanced multislice helical CT in the diagnosis of distal segmental and subsegmental pulmonary emboli. A comparative study." Vancouver General Hospital, BCU, Vancouver, Canada. Director: Nestor L. Müller MD

Publications

Co-Author of 3 Books (Muller's Diseases of the Lung. Radiologic-Pathologic Correlations. 2nd Ed. Kyung Soo Lee, Tomás Franquet, Joungho Han and Takeshi Johkho), Contributions to Key Clinical Questions. Pulmonary Imaging. Sujal Desai MD, Tomás Franquet MD, Thomas Hartman MD, Athol Wells MD, and Imaging of Pulmonary Infections. Nestor L. Müller MD, Tomás Franquet MD & Kyung Soo Lee MD. Contributing Author: 38 Book Chapters.
Published articles: 127 Peer reviewed articles

THOMAS FRAUENFELDER, ZURICH/CH

Prof. Dr. Thomas Frauenfelder, MD, is the director of the Institute of Diagnostic and Interventional Radiology of the University Hospital Zurich and section chief of chest imaging. He had his training in Zurich and was research resident at National Centre of Competence in Research (NCCR) for Computer aided and image guided medical interventions (Co-Me) at the ETH. His main research fields encompass cardiovascular and pulmonary imaging.
The focus during the last years was on CT and lung imaging. Different projects focussed on the validation of techniques for dose reduction by maintaining image quality. Currently he is focusing on the use of texture analysis and AI in mixed connective diseases related interstitial lung disease. He is member of the executive board of ESTI (European Society of Thoracic Imaging).

FERGUS GLEESON, OXFORD/UK

Professor Fergus Gleeson is a Consultant Radiologist and Professor of Radiology in Oxford. He trained in Cambridge, Papworth and London, and was a Fellow in Radiology at UCLA in America. He was appointed to Oxford in 1992, is Head of Academic Radiology in Oxford, and is the Director of the Oxford Radiology Research Unit at Oxford University Hospitals NHS Foundation Trust. He is a past President of the European Society of Thoracic Imaging, and has published over 200 peer review papers and book chapters, has a h-index of 62, and currently has more than £30 million in grant income.
He is the PI for IDEAL and DART, two multicentre studies investigating the use of Artificial Intelligence in pulmonary nodules and lung cancer, and the PI for EXPLAIN, a multicentre study investigating Long COVID using hyperpolarised Xenon MRI. His specialist interests are in Artificial Intelligence, Thoracic Imaging, PET-CT and Hyperpolarized xenon MRI. He is also the Chief Medical Officer of the National Consortium of Intelligent Medical Imaging (NCIMI): which aims to bring together the NHS, and University and industry partners to promote the development and implementation of artificial intelligence in medicine.

IENEKE HARTMANN, ROTTERDAM/NL

Ieneke Hartmann is a radiologist at Maasstad Hospital Rotterdam. After graduation at Erasmus University Medical School Rotterdam/NL, she was a PhD candidate (1996-2000) and served as a resident radiologist (2000-2004) both at UMC Utrecht/NL. After spending one year as a clinical fellow in thorac radiology in Lille, France (2005), she became head of thoracic radiology at the Erasmus MC Rotterdam (2006-2011) and since 2011 at the Maasstad Hospital Rotterdam.
She was co-founder and president of the Thoracic Section of the Radiological Society of the Netherlands (2011-2018), and was and currently is a member of various committees and study groups of the Radiological Society of the Netherlands, European Society of Thoracic Imaging and European Society of Radiology.
Since her residency, she has been active in teaching and speaks at national and international meetings including the Radiological Society of the Netherlands, ESTI and ECR.

ANNA RITA LARICI, ROME/IT

Degree

- Qualification as Medical Doctor with full marks at University of Chieti, Italy, in 1995
- Post-graduation in Biomedical Technologies at University of Chieti, Italy, in 1997
- Post-graduate degree as Radiologist with full marks at University of Chieti, Italy in 2001

Clinical and Research Position

- Clinical Radiologist at the Department of Diagnostic Imaging, Oncological Radiotherapy and Hematology, Fondazione Policlinico Universitario "A. Gemelli" IRCCS, Rome, Italy, from October 2004 up to now, with High Level of Expertise (MEDD 07) from January 2019 up to now.
- Coordinator of the Tumour Board of Lung Cancer for the Comprehensive Cancer Center of Fondazione Policlinico Universitario "A. Gemelli" IRCCS, Rome, from 2019 up to now.
- Coordinator of the Multidisciplinary Team dedicated to Interstitial Lung Disease (ILD) at Fondazione Policlinico Universitario "A. Gemelli" IRCCS, Rome, from 2014 up to now.
- Assistant Professor at the Department of Radiological and Hematological Sciences, Section of Radiology, Catholic University of the Sacred Heart, Rome, Italy, from October 2011 up to now.

Scientific Activity

She presented more than 150 oral talks as Invited Speaker in National and nternational Meetings. She has been invited as Moderator in more than 50 Scientific and Educational Sessions in National and International Meetings. She participated to the Programme Committes of National (SIRM, AIOM) and International Congresses (ECR, ESTI).

ANASTASIA OIKONOMOU, TORONTO/CA

Dr. Anastasia Oikonomou completed medical school and diagnostic radiology residency in Aristoteles University of Thessaloniki, Greece and completed her PhD in Democritus s University of Thrace. She pursued fellowships in thoracic imaging in London, UK and in Ottawa and Vancouver, Canada. She completed a cardiac imaging fellowship later in Ottawa, Canada. She is a Staff Cardiothoracic radiologist and the Head of the Cardiothoracic Imaging Division in Sunnybrook Health Sciences Centre in Toronto, Canada.
She is a faculty member of the University of Toronto at the rank of Associate PRofessor. Her research interests are mainly focused on prognostication of lung malignancies using artificial intelligence with CT, PETCT and lung MRI.

ANAGHA P. PARKAR, BERGEN/NO

General radiologist with a special interest in thoracic, cardiac and musculoskeletal imaging. Currently working in the Haraldsplass Deaconess Hospital in Bergen, Norway.
She is also the president elect of the ESTI, and an active member of the ESSR and the ESR contributing on various boards and subcommittees.

MATHIAS PROKOP, NIJMEGEN/NL

Mathias Prokop studied Medicine and Physics in Germany, in Marburg and Hanover. He finished his training as a radiologist at Hanover Medical School, and then continued as a staff member and head of CT and ultrasound.
In 1998, he transferred to the University of Vienna as an Associate Professor. After his move to The Netherlands, to the University Medical Center Utrecht in 2002, he finished his book on Spiral- and Multislice CT Imaging. Utrecht appointed him Full Professor in 2004, and his work focus moved to early detection of disease, especially lung screening and cardiac imaging.
His fruitful collaboration with Bram van Ginneken explored applications of machine learning in chest imaging. Prokop became Chairman of the Department of Radiology at Radboudumc in Nijmegen in 2009. By 2020, Radiology, Nuclear Medicine and Anatomy have been fused to form the Department of Medical Imaging. This year, Mathias Prokop has also been appointed Professor and Chairman of the Department of Radiology at the University Medical Center in Groningen to strengthen clinical and research collaboration between the two universities. His own research stays focused on technology and early detection of lung cancer.
As head of the Dutch Society of Radiology (NVvR), he focuses on the strategic re-orientation of Radiology away from pure reporting towards diagnostic consulting, treatment and innovation functions. His goal is to better position the diagnostic process and minimally invasive treatment within the healthcare systems of the future. He believes that more precise diagnoses can avoid unnecessary pain, treatment and cost and can help keep our healthcare system sustainable.

HELMUT PROSCH, VIENNA/AT

Helmut Prosch, MD, is an Associate Professor at the Department of Biomedical Imaging and Image-guided Therapy at the Medical University of Vienna, Vienna, Austria, where he serves as the deputy head of the division of general and paediatric radiology and is the section chief of thoracic imaging. His research focuses on the diagnosis and staging of lung cancer and deep learning for the diagnosis of diffuse parenchymal lung diseases. He has published more than 180 articles, reviews or book chapters.

MARIE-PIERRE REVEL, PARIS/FR

Prof. Revel is Head of the Radiology department at Cochin Hospital in Paris, France. She is a member of the planning committee of the European Congress of Radiology (ECR) and former president of the European Society of Thoracic Imaging (ESTI, European Society of Thoracic Imaging). She coordinated the advice paper on COVID-19 from the European Society of Radiology (ESR) and the European Society of Thoracic Imaging (ESTI).
She is the principal investigator of the STOIC project (Study of ThOracIc CT in Covid-19 pneumonia) of Assistance Publique des Hôpitaux de Paris, building an annotated database of more than 11,000 chest CT scans, in order to develop deep learning-based solutions for the diagnostic, quantification and prognostic of Covid-19 pneumonia.

CORNELIA SCHAEFER-PROKOP, AMERSFOORT/NL

Cornelia Schaefer-Prokop received her professor of Radiology at Hanover Medical School, Germany in 2007. She works at Meander Medical Centre in Amersfoort, and at Radboud University Nijmegen, the Netherlands.
Prof. Schaefer-Prokop's research covers areas of applications of computer-aided diagnosis/artificial intelligence in CT and radiography, CT of interstitial lung diseases, lung cancer screening as well as diagnosis and staging of bronchogenic carcinoma.
She is or has been editorial board member of Radiology and European Radiology. She is author of some 200 articles in peer reviewed journals and more than 40 book chapters, is co-editor or editor of 3 books (Computed Tomography of the Body, Critical Care Radiology and the 6th/ 7th edition of the Grainger & Allison).
Cornelia Schaefer-Prokop has been invited lecturer at international conferences and postgraduate teaching courses including the ECR, RSNA, ERS and the IDKD. She was president of the European Society of Thoracic Imaging (ESTI) in 2014 and president of the Fleischner Society in 2022.

ANNEMIEK SNOECKX, EDEGEM/BE

Annemiek Snoeckx, MD, PhD is Associate Professor at the University of Antwerp and Chair of the Radiology Department of the Antwerp University Hospital in Belgium. Professor Snoeckx's clinical and research interests are in the field of chest imaging, in particular thoracic oncology (in general), lung cancer, pulmonary nodules, lung cancer screening and implementation of artificial intelligence. She is an active member of numerous committees within the European Society of Thoracic Imaging, European Society of Radiology, European Respiratory Society and Belgian Society of Radiology. Professor Snoeckx is passionate about education on thoracic oncology topics. She authored or co-authored more than 75 papers in peer-reviewed journals and has lectured at many national and international meetings and courses.

PROGRAMME OVERVIEW

THURSDAY, DECEMBER 8

12:00-12:30 Lunch/Welcome

12:30-13:50 Session 1: Chest CT
Moderator: A.P. Parkar, Bergen/NO

12:30 Welcome
A.P. Parkar, Bergen/NO

12:35 Pneumoconioses
H. Prosch, Vienna/AT

13:00 CT of trachea and large airways
M. Prokop, Nijmegen/NL

13:30 CT of small airways
J. Biederer, Heidelberg/DE

13:50-14:05 Coffee Break

14:05-14:50 Industry sponsored symposium
Moderator: A.P. Parkar, Bergen/NO

14:05 When progressive isn't progress: Progressive Pulmonary Fibrosis
H. Prosch, Vienna/AT

14:45 Q&A

14:50-15:05 Coffee Break

15:05-16:25 Session 2: ILD I
Moderator: H. Prosch, Vienna/AT

15:05 Interstitial lung disease in collagenosis
C. Schaefer-Prokop, Amersfoort/NL

15:35 Imaging smoking related disease
G. Chassagnon, Paris/FR

16:00 Drug induced pulmonary disease, incl. HP
C. Schaefer-Prokop, Amersfoort/NL

16:25-16:45 Coffee Break

16:45-18:00 Session 3: ILD II
Moderator: A.P. Parkar, Bergen/NO

16:45 Interesting ILD cases
M-P. Revel, Paris/FR

17:30 HRCT patterns (nodular, linear, mosaic)
T. Frauenfelder, Zurich/CH

FRIDAY, DECEMBER 9

08:00-09:30 Session 4: Cancer I
Moderator: A. Snoeckx, Edegem/BE

08:00 Lung cancer staging
J. Biederer, Heidelberg/DE

08:30 Pleural neoplasms
A. Snoeckx, Edegem/BE

09:00 Mediastinal tumors
I. Hartmann, Rotterdam/NL

09:30-10:00 Coffee Break

10:00-11:15 Session 5: Cancer II
Moderator: M-P. Revel, Paris/FR

10:00 PET/CT evaluation lungs
M. Prokop, Nijmegen/NL

10:25 Imaging evaluation after immunetherapy
M-P. Revel, Paris/FR

10:50 Difficult cases of lung cancer MDTs
A.R. Larici, Rome/IT

11:15-11:20 Break

11:20-12:05 Industry sponsored symposium
Moderator: F. Gleeson, Oxford/UK

11:20 Using artificial intelligence for oncological thoracic imaging: Is it a true addition?
M-P. Revel, Paris/FR

12:05-13:00 Lunch

13:00-14:30 Session 6: LCS, US, interventions
Moderator: T. Frauenfelder, Zurich/CH

13:00 Management of nodules, LCS
A.R. Larici, Rome/IT

13:30 Lung ultrasound and Thoracic interventions
T. Frauenfelder, Zurich/CH

14:00 MRI of the lungs applications/ future
A. Oikonomou, Toronto/CA

14:30-15:00 Coffee Break

15:00-16:30 Session 7: MRI, AI, Cardiac
Moderator: A.P. Parkar, Bergen/NO

15:00 Imaging of mycobacterial infection
F. Gleeson, Oxford/UK

15:30 Artificial intelligence in chest radiology
F. Gleeson, Oxford/UK

16:00 Quiz cases
G. Chassagnon, Paris/FR

SATURDAY, DECEMBER 10

08:15-09:45 Session 8: Granulamatoud disease and infections
Moderator: A.P. Parkar, Bergen/NO

08:15 Sarcoidosis and granulomatous disease
H. Prosch, Vienna/AT

08:45 Pulmonary infections
T. Franquet, Barcelona/ES

09:15 Cardiac findings on chest CT
A.P. Parkar, Bergen/NO

09:45-10:15 Coffee Break

10:15-11:00 Industry sponsored symposium: Lung cancer screening – The latest news
Moderator: A.P. Parkar, Bergen/NO

10:15 Biggest change in 20 years: Update on lung cancer screening programs at European level
S. Schmidt, Forchheim/DE

10:30 Screening and early detection of cardiothoracic diseases: A radiological perspective
R. Vliegenthart, Groningen/NL

10:45 Q&A

11:00-13:00 Session 9: Thoracic emergencies
Moderator: J. Biederer, Heidelberg/DE

11:00 Acute aortic syndrome, diagnosis/ post treatment
G. Aviram, Tel Aviv/IL

11:30 Thoracic trauma imaging
A. Oikonomou, Toronto/CA

12:00 Pulmonary embolism, pulmonary hypertension
G. Aviram, Tel Aviv/IL

12:30 Information ESTI, Diploma, future ESTI meetings
J. Biederer, Heidelberg/DE; A.P. Parkar, Bergen/NO

13:00-14:00 Lunch/Farewell

ABSTRACT SYLLABUS

PNEUMOCONIOSES

H. Prosch, Vienna/AT

Description

Pneumoconioses are granulomatous lung diseases caused by chronic (occupational) inhalation of inorganic dusts. The most common pneumoconioses are silicosis, coal workers pneumoconiosis, talcosis, asbestosis, and berylliosis. The diagnosis of pneumoconiosis depends primarily on the patient's medical history and imaging. On a pathological basis, pneumoconiosis can be divided into fibrotic (e.g. silicosis, asbestosis) and non-fibrotic forms (e.g. siderosis, welder's pneumoconiosis). The type and extent of the individual lung diseases depend on the type and size of the inhaled dust and the duration of exposure. Imaging plays a central role in characterizing lung disease as well as in diagnosing disease complications.

CT OF TRACHEA AND LARGE AIRWAYS

M. Prokop, Nijmegen/NL

Description

CT evaluation of the trachea and large airways can be performed on routine thin-section CT but expiratory or dynamic scans may be required to optimally diagnose certain diseases. Simple and more complex visualization techniques will be discussed. Cartilaginous and membranous portions of the tracheobronchial system are uniquely affected by various diseases. The course will discuss congenital variants and findings in trauma, infections, inflammatory disorders, neoplasms. It will cover a wide spectrum of tracheal diseases and provide guidance on how to best establish the most likely diagnosis in patients with abnormalities in the tracheobronchial system.

Learning objectives

1. To learn how to assess tracheobronchial stability with expiratory and dynamic CT scans
2. To become familiar with various visualization techniques for the tracheobronchial system and when to use them
3. To understand tracheobronchial anatomy and how various diseases differentially affect the cartilaginous and membranous components
4. To learn how to best differentiate the various diseases affecting the tracheobronchial system

CT OF SMALL AIRWAYS

J. Biederer, Heidelberg/DE

Description

Imaging of the airways and their diseases plays an increasing role for scientific investigation and clinical monitoring. Specific therapeutic approaches e.g. in chronic obstructive lung disease or cystic fibrosis have raised the need for following local alterations of lung morphology and function beyond the scope of global tests such as spirometry – in particular for small airways that contribute only little to total airway resistance and thus can hide a significant amount of disease from conventional pulmonary function tests.

Despite their differences in etiology and pathophysiology, airway diseases have common radiological manifestations. Computed tomography (CT) is typically the technique of choice to study diffuse diseases and small airways involvement with high spatial resolution.

In healthy subjects, multi-slice computed tomography (MSCT) depicts peripheral airways down to the 8th generation. Even smaller airways disease may become directly visible with bronchiectasis or with intrinsic contrast enhancement, e.g. from retained mucus in patients with cystic fibrosis. Such alterations become visible as centrilobular nodules when airways are oriented perpendicular to the imaging plane or as tree-in-bud sign when they are oriented parallel to the imaging plane. Dysfunction of small airways (i.e. expiratory collapse or occlusion) can become visible as mosaic pattern or air trapping on expiratory scans as indirect signs of bronchiolar involvement.

More differentiated functional imaging is achieved with contrast enhancement. Intravenous application of a contrast bolus can show perfusion deficits due to airway obstruction and hypoxic vasoconstriction as an indirect functional test. Dual energy CT (DECT) is capable to show these effects in clinical use. Direct visualization of ventilated airspace can be achieved with DECT and Xenon- (alternatively Krypton) inhalation, however, these technologies are usually not readily available for clinical imaging.

Take-home messages

- With MSCT, airways are directly visualized to the 8th (CT) order.
- Bronchiectasis and mucous plugging increase the visibility of even smaller airways.
- Mosaic perfusion and air trapping are indirect signs of bronchiolar involvement.
- Perfusion deficits after i.v.-contrast reflect hypoxic vasoconstriction in ventilation disorders.
- Inhaled Xenon may be used to directly visualize pulmonary airspace with DECT.

INTERSTITIAL LUNG DISEASE IN COLLAGENOSIS

C. Schaefer-Prokop, Amersfoort/NL

Description

Collagenvascular diseases are characterized by a variety of patterns of interstitial fibrosis. Though there is no specific pattern seen exclusively in one particular disease, prevalence and dominant patterns vary between the different diseases, which can be used for discrimination. The final diagnosis of CVD is a multidisciplinary diagnosis and includes not only HRCT but also serum markers, extrapulmonary symptoms, e.g., arthritis and findings from bronchoalveolar lavage.

After reviewing the various patterns of ILD, the focus of the presentation will lie on

- which findings are suggestive for a specific CVD
- discriminative features to differentiate systemic from idiopathic ILD and on
- features that determine the prognosis of the patient

IMAGING SMOKING RELATED DISEASE

G. Chassagnon, Paris/FR

Description

This presentation will discuss the main manifestations of smoking-related lung diseases, including chronic obstructive pulmonary disease (COPD) and smoking-related interstitial lung disease (ILD). It will cover the different subtypes of emphysema, CT-definable phenotypes of COPD and CT findings of the main smoking-related ILDs, including respiratory bronchiolitis with ILD, desquamative interstitial pneumonia, Langerhans cells histiocytosis and Combined Pulmonary Fibrosis and Emphysema (CPFE) syndrome.

DRUG INDUCED INTERSTITIAL LUNG DISEASE INCLUDING HYPERSENSITIVITY PNEUMONITIS

C. Schaefer-Prokop, Amersfoort/NL

Description

Basically all patterns seen in idiopathic or systemic ILD are also observed in drug induced interstitial lung disease(DILD). The most frequent patterns are non-specific interstitial lung disease (NSIP), organizing pneumonia (OP) and diffuse alveolar damage (DAD). There is no specific pattern

characteristic for a particular drug. While traditional chemotherapy mostly causes diffuse parenchymal changes, increasing use of immunotherapy alone and in combination with chemotherapy and/or radiation therapy have led to new patterns of DILD that can be very focal or very asymmetric. Most important differential diagnosis include infection, edema, underlying malignancy or changes induced by radiation therapy. The diagnosis is multidisciplinary and requires information about the type and time line of pharmacological and radiation therapy, preexisting lung disease and presence of systemic diseases.

After reviewing the various patterns of ILD, the focus of the presentation will lie on

- which patterns are suggestive for DILD
- discriminative features to differentiate DILD from infection, edema
- which clinical information (time line, radiation therapy), lab findings and BAL findings may helpful for the DD

Description

While subacute hypersensitivity pneumonitis (HP) is mostly characteristic with respect to clinical context and CT findings (centrilobular acinar nodules, sometimes confluent to ground glass and lobular air-trapping), chronic HP presents a more challenging diagnosis. The presence of three, sharply demarcated density zones (head cheese sign) with lobules with normal attenuation, decreased attenuation and air-trapping and increased attenuation and signs of fibrosis is the most helpful sign to diagnose chronic HP. Lobular air-trapping and honeycombing is also seen in IPF, nevertheless is a distribution along the bronchovascular bundle and a predominance in more apical and midzones rather than in the lower lung zones more suggestive for chronic HP.

After reviewing the various patterns of subacute and chronic HP, the focus of the presentation will lie on

- discriminative features to differentiate chronic HP from IPF
- features that determine the prognosis of the patient

INTERESTING ILD CASES

M-P. Revel, Paris/FR

Description

This session will present a series of ILD cases with their final diagnosis. The reasoning to narrow the differentials will be explained. These cases will include examples of pulmonary toxicity, hypersensitivity pneumonitis, intra alveolar haemorrhage and pulmonary fibrosis. Cystic pulmonary diseases will also be discussed.

HRCT PATTERNS (NODULAR, LINEAR, MOSAIC)

T. Frauenfelder, Zurich/CH

Description

The goal of this lecture is to provide information about the anatomy of the lung and to provide a structured approach to the different interstitial patterns. High-resolution CT gives detailed morphologic information about lung structures. This allows distinguishing findings by their typical predominance in certain anatomical compartments. The three main patterns found in interstitial lung diseases are the nodular, the linear and mosaic pattern. During this lecture, a stepwise algorithm for differentiating the three different patterns will be provided that allows a pragmatic approach for a successful reading of HRCT. The base for the diagnosis is the description of the distribution and dominance of the patterns in relation to the bronchial, vascular and parenchymal lung structure.

Learning objectives

1. To become confident in recognizing the anatomical compartments of the lung on HRCT
2. To get familiar with a step-wise approach to interstitial diseases
3. To describe typical imaging patterns of lung disease on HRCT using appropriate terminology

LUNG CANCER STAGING

J. Biederer, Heidelberg/DE

Description

Prognosis and stage-adapted management of lung cancer are defined and guided by detailed staging. The current 8th TNM classification includes descriptors for early stages of the primary tumor such as atypical adenomatous hyperplasia (AAH – T0), adenocarcinoma in situ (AIS – Tis), lepidic predominant

adenocarcinoma (LPA – T1a), minimally invasive adeno-carcinoma (MIA – Tmi), part solid nodules with a solid component up to 5 mm (T1a) and solid tumors up to 3 cm (T1 a/b/c). Larger lesions are staged for sizes of up to 4 cm (T2a), 5 cm (T2b) and 7 cm (T3). Lesions larger than 7 cm and lesions with invasion of the diaphragm are considered T4, while involvement of the main bronchus regardless of tumor distance to carina as well as atelectasis define T2 disease. Lung metastases on the same side of the chest are described as T3 (within the same lobe) or T4 (within other lobes).

The classification of lymph node involvement (N-staging) integrates findings from PET, if available. Hilar (N1), ipsilateral mediastinal or sub-carinal (N2) and contralateral nodules (N3) are differentiated. Typically, N2 defines a worse prognosis compared to T1 while N3 defines a change in management (typically no more resectable and indicating the need for systemic therapy). Staging of distant metastases differentiates between metastases inside the contralateral lung (M1a) and lesions inside other organs or extra-pleural lesions (if single, M1b; if multiple M1c). Typically, T4, N3 and any M1 staging are indicators for no more resectable disease.

The recommended imaging technologies for lung cancer staging comprise CT (T, N, M), PET (N-staging) and MRI (M-staging). Other important methods (endobronchial ultrasound) and thoracic interventions will be addressed. The diagnostic scope of all modalities individually, in combination or as hybrid technology for T/N/M-staging will be discussed against the background of the current guidelines.

Take-home messages

- T-staging differentiates early lesions (T0, Tis, Tmi, T1a), small tumors up to 2 cm (T1b) or 3 cm (T1c), and larger lesions up to 4 cm (T2a), 5 cm (T2b), 7 cm (T3) and above (T4).
- N-staging differentiates hilar (N1), ipsilateral mediastinal or sub-carinal (N2) and contra-lateral nodes (N3).
- M-staging differentiates intra-pulmonary (M1a), oligo-metastatic disease (M1b) and multiple distant metastases (M1c).
- Typically, T4, N3 and M1 are indicators for no more resectable disease.

PLEURAL NEOPLASMS

A. Snoeckx, Edegem/BE

Description

Malignant pleural mesothelioma is the commonest primary pleural malignancy. In majority of cases it is associated with asbestos exposure. Imaging plays an important role in diagnosis, staging and assessment of therapy response. Recognition of mesothelioma across multiple imaging modalities is

important. CT remains the primary imaging modality of choice: it demonstrates the extent of primary tumor, intrathoracic lymphadenopathy and extrathoracic metastatic spread. MR may play a role in identifying chest wall invasion, mediastinum and diaphragm.

Pleural malignancies, other than mesothelioma and metastases, are very rare. According to the latest World Health Organization Classification these tumors can be further divided into lymphoproliferative disorders and mesenchymal tumors. The latter includes malignant solitary fibrous tumor, desmoid-type fibromatosis, sarcomas, desmoplastic round cell tumor, ... Pleural lymphoma can be primary or secondary. Primary lymphoma is a very rare entity that can be seen in the setting of HIV with primary effusion lymphoma or associated with pyothorax. Imaging findings are nonspecific but an isolated pleural lesion is unlikely to represent lymphoma. Secondary pleural lymphoma is most commonly non-Hodgkin lymphoma and mainly seen in association with other types of thoracic involvement. Pleural solitary fibrous tumors are malignant in up to one third of cases. On CT these well circumscribed pedunculated large masses are heterogeneous. Calcifications and associated pleural effusion are less common.

Whereas chest radiographs can be the initial study for detection, Computed Tomography remains the imaging modality of choice for primary assessment of pleural masses. Magnetic Resonance Imaging and Positron emission Tomography may have a role in further characterization and staging.

MEDIASTINAL TUMORS

I. Hartmann, Rotterdam/NL

Description

For the diagnostic approach of mediastinal masses the lesion location and features of the lesion on CT and MRI are key. Several compartment classification systems based on either anatomy, radiography or CT are being used. The major advantages of the CT-based 3-compartment classification system as proposed in 2017 by the International Thymic Malignancy Interest Group (ITMIG) are the relatively simple design and the use of true anatomic planes. The prevascular (or anterior) mediastinum is the most common location of mediastinal tumors, whereas the involvement of the visceral (middle), paravertebral (posterior) or in some instances more than one compartment occurs less frequently.

Once it is decided in which compartment the mass is located, imaging features of the lesion such as the shape, margin, invasion to the surrounding structures, presence of cystic components, fat and calcification are important to further narrow the differential diagnosis.

For the majority of lesions CT is the imaging method of choice. MRI is used for problem-solving and for masses in the paravertebral compartment. The role of PET-CT is limited and it is mainly used for assessment of disease extent in specific situations.

In this presentation the diagnostic approach, the mediastinal compartments, the most common tumors per compartment and their differential diagnoses will be discussed.

PET/CT EVALUATION LUNGS

M. Prokop, Nijmegen/NL

Description

PET-CT is well-established for the staging and follow-up of lymphoma, and for staging of bronchogenic cancer. This presentation will discuss the role of PET-CT for these indications but also for differentiation of benign and malignant nodules, and for establishing recurrence of treated lung cancers. Emerging indications include infectious and inflammatory diseases, such as septic emboli, vasculitis or sarcoidosis. Pitfalls and the complimentary role of a diagnostic CT will be extensively discussed. Suggestions for writing joint PET-CT reports will be provided.

Learning objectives

1. To understand the role of PET-CT for staging and follow-up of lymphoma
2. To learn to interpret PET-CT for staging of lung cancer
3. To comprehend the issues when using PET-CT for differentiating pulmonary nodules
4. To learn about emerging indications of PET-CT
5. To learn how to avoid pitfalls and write a joint PET-CT report

IMAGING EVALUATION AFTER IMMUNETHERAPY

M-P. Revel, Paris/FR

Description

This lecture will explain the basis of response evaluation criteria under immunotherapy (iRECIST). The concept of pseudo and hyperprogression will be explained and illustrated. Examples of pulmonary toxicity under checkpoint inhibitors will also be presented.

DIFFICULT CASES OF LUNG CANCER MDTS

A.R. Larici, Rome/IT

Description

Lung cancer is the leading cause of cancer-related mortality worldwide. Despite advances in treatments, the 5-year survival rate remains low reflecting the still large proportion of patients receiving a diagnosis in a metastatic stage of disease. Therefore to improve lung cancer outcome is a high priority. On the other hand, the survival rate for localized disease increased up to 57 %, underlining the great potential of the early diagnosis and screening programs. Changes in the therapeutic scenario, especially for NSCLC (non-small cell lung cancer), have emphasised the need for a multidisciplinary team (MDT) approach in lung cancer. Indeed, MDT approach has emerged as the standard of care in cancer management in the last two decades, and it is now considered a medical intervention in its own right. MDT management, by timely delivering best evidence-based practice care, has been shown to improve patient-centered outcomes and survival, and to influence providers' initial plans in substantial proportions of patients. The most common clinical scenarios presented at the MDT are pulmonary nodule management and stage III-IV lung cancer, the latter characterized by extreme heterogeneity. Other issues commonly discussed by MDT are response assessment and differential diagnoses among lung toxicity – induced by targeted therapies and immunotherapy – and lung infections or recurrence. In this lecture, all these issues will be discussed by presenting challanging cases approached by MDT.

Learning objectives

1. To learn how to optimize by imaging lung cancer staging and to properly address patients to the best therapeutical option
2. To highlight by cases how multimodality treatments have changed the needs of oncologists and the answers from radiologists in patients with advanced lung cancer
3. To provide imaging clues helpful in recognizing lung toxicity due to novel treatments respect to infections or disease recurrence in advanced lung cancers

MANAGEMENT OF NODULES, LCS

A.R. Larici, Rome/IT

Description

Management of pulmonary nodules identified at low-dose computed tomography (CT) scans strictly depends on the diverse attenuation appearance of the nodule (solid, non-solid, part-solid), which is associated with different probability of malignancy and prognosis. The prevalence of screen-detected solid nodules (SNs) and subsolid nodules (SSNs) – which include non-solid and part-solid nodules - largely varied according to the different nodule size cutoff used in lung cancer screening (LCS) trials published so far. In the context of LCS, the goal for the radiologists should be to early identify malignant nodules and, at the same time, to avoid unnecessary CT follow-up or invasive procedures in subjects with benign nodules. Morphologic characteristics, size and growth are the major determinants of nodule malignancy. In regards to morphologic appearance, the first step is to recognize and exclude from further evaluation nodules with frank benign appearances (intrapulmonary lymph nodes, benign tumours, inflammatory lesions). Spiculated/irregular margins, pleural indentation, cystic-airspace and appearance/increase of solid component within a SSN are characteristics suggestive of malignancy. The assessment of nodule growth on CT is a major issue, considering that measurements with electronic calipers are subject to variability and variability increases with the increasing complexity of nodule morphology. Volumetry has been accepted as the best option to determine nodule size and growth. Furthermore, there are evidence that nodule mass (volume x mean attenuation) may be the optimal way to evaluate if a SSN is growing. Therefore, guidelines for screen-detected nodule management have included volume and volume doubling time in the attempt to optimize nodule stratification and management.

Learning objectives

1. To learn about key radiological features suggesting a benign cause
2. To highlight the methods allowing identifying malignant nodules
3. To understand how to manage nodules in LCS

LUNG ULTRASOUND AND THORACIC INTERVENTIONS

T. Frauenfelder, Zurich/CH

Description

Ultrasound is increasingly used in the Intensive Care Unit. It may be used to confirm the presence of a pleural effusion and help to determine if it suitable for or requires drainage. US plays a key role in guiding chest drain insertion and identifying post insertion complications. More recently, it has been shown to be useful in diagnosing a pneumothorax, particularly in the context of a recent line insertion. It may also be of value in diagnosing heart failure, infection and has been reported to be of value in diagnosing pulmonary embolic disease.

Learning objectives

1. To learn the basic findings and how to interpret them
2. To become familiar with the strengths and limitations of the technique

MRI OF THE LUNGS APPLICATIONS/FUTURE

A. Oikonomou, Toronto/CA

Description

MRI of the lungs has undergone the last fifteen years ground-breaking technological developments.

Undoubtedly the biggest advantage of MRI has been the lack of ionizing radiation offering an alternative diagnostic modality to extreme ages such as women at child-bearing age and pediatric patients as well as in patients with allergy to iodinated contrast medium.

With major technological advances related to fast sequence and parallel imaging, gating and signal enhancement MRI has gained the unique ability of assessing lung function in addition to higher resolution of morphologic and anatomic imaging.

MRI has classically been the mainstay in the management of superior sulcus tumors, tumors where chest wall invasion is suspected and for further characterization of mediastinal tumors and pleural mesothelioma.

However MRI is increasingly gaining recognition in clinical practice in fields where CT used to be unbeatable such as diagnosis of pulmonary embolism, pulmonary arterial hypertension, staging of lung cancer, detection of early lung cancer and small pulmonary nodules, emphysema and airways disease such as cystic fibrosis.

Learning objectives

1. To review the main clinical indications for which thoracic MRI is widely used.
2. To review the clinical indications and MRI findings for which thoracic MRI is increasingly used such as pulmonary embolism, lung cancer staging, detection of early lung cancer, emphysema and cystic fibrosis.
3. To review basic clinical MRI protocols for the most common clinical indications.
4. To understand the persisting limitations of thoracic MRI and anticipated future progress.

IMAGING OF MYCOBACTERIAL INFECTION

F. Gleeson, Oxford/UK

Description

This presentation will discuss the background to mycobacterial infection, including the increase in drug resistant mycobacterial infection. It will cover the global burden of disease, screening protocols and common appearances on CXR and CT. It will discuss the techniques available for obtaining a tissue diagnosis, and also cover non-tuberculous mycobacterium, and its diagnosis on CT. It will also cover some areas of research and the use of PET-CT.

ARTIFICIAL INTELLIGENCE IN CHEST RADIOLOGY

F. Gleeson, Oxford/UK

Description

This presentation will discuss the background to developing, testing and validating artificial intelligence algorithms. Common problems with the development of artificial intelligence algorithms and their use in clinical practice will be discussed. The need for ensuring that the algorithms are used appropriately and those using them are adequately trained and the techniques available to ensure this will be presented. The presentation will also include potential future developments.

QUIZ CASES

G. Chassagnon, Paris/FR

Description

This interactive session will provide an opportunity to review several of the topics covered during the ESTI winter course through clinical cases.

PULMONARY INFECTIONS

T. Franquet, Barcelona/ES

Description

Despite advances in diagnosis and treatment, respiratory tract infection continues to be a major cause of morbidity and mortality. Pneumonia is the leading cause of death due to infectious disease. In the absence of clinical information, radiologists cannot reliably distinguish between pneumonia and other pulmonary processes. Although CT scan is not recommended for the initial evaluation of patients with pneumonia, it is a valuable adjunct to conventional radiography, being helpful in better characterizing complex pneumonias and in detecting complications.

Unfortunately, the clinical data and radiographic findings often fail to lead to a definitive diagnosis of pneumonia because there is an extensive number of noninfectious processes associated with febrile pneumonitis, including drug-induced pulmonary disease, acute eosinophilic pneumonia, organizing pneumonia, and pulmonary vasculitis that may mimic pulmonary infection.

In the last decades there has been an increase in not only the prevalence of various infections but also the recognition of several important new viral pathogens such as hantaviruses, human metapneumovirus, avian influenza A viruses, and coronavirus (COVID-19).

CARDIAC FINDINGS ON CHEST CT

A.P. Parkar, Bergen/NO

Description

Cardiac findings on CT are often missed and go unreported on chest CT examinations.

Some are of no clinical importance, but others are vital and may cause severe illness and in some cases death. The presentation will guide you through the most common and most important cardiac findings on chest CT.

ACUTE AORTIC SYNDROME, DIAGNOSIS/POST TREATMENT

G. Aviram, Tel Aviv/IL

Description

Acute Aortic Syndrome (AAS) is a bag of potentially lethal conditions requiring accurate timely diagnosis. It encompasses diseases which primarily affect the media (spectrum of aortic dissection, intramural hematoma, limited intimal tear, or the intima (penetrating aortic ulcer). Radiologists should be familiar with all possible AAS variants which may co-exist in the same patient, and possible immediate and late complications.

Management is based on the Stanford (anatomical) classification. The optimal CT protocol for accurate diagnosis should include ECG-gated non-contrast & CT angiography. Following aortic surgery, CT is commonly used for assessment of complications and follow-up. Imaging appearances of the common components used in proximal aortic repair will be reviewed.

THORACIC TRAUMA IMAGING

A. Oikonomou, Toronto/CA

Description

Thoracic injury overall is the third most common cause of trauma following injury to the head and extremities. More specifically, penetrating thoracic injury is the cause of 4-15% of admission to major trauma centers. Blunt and penetrating thoracic trauma has a high morbidity and mortality accounting for approximately 25% of trauma-related deaths, second only to head trauma. More than 70% of cases of blunt thoracic trauma are due to motor vehicle collisions with the remaining caused by falls or blows from blunt objects. Penetrating thoracic injury is mainly caused by knives and handgun bullets. Mechanisms of injury are discussed and spectrum of abnormalities and radiologic findings encountered in blunt and penetrating thoracic trauma are categorized in injuries of pleural space (pneumothorax, hemothorax), lungs (pulmonary contusion, laceration, herniation), airways (tracheobronchial lacerations, Macklin effect), esophagus, heart, aorta and great vessels, diaphragm and chest wall (rib, scapular, sternal fractures and sternoclavicular dislocations). The possible coexistence of multiple types of injury in a single patient is stressed and therefore systematic exclusion after thorough investigation of all types of injury is warranted. Chest radiography plays an important role in the initial emergency work-up of the chest trauma patient, facilitating detection of tension pneumothorax, large-volume hemothorax, flail chest, or malpositioned instrumentation. Multidetector computed tomography (MDCT) has, however, established

itself as the preferred imaging method for the evaluation of polytrauma patients allowing for significantly reduced scanning times to a few seconds allowing more time for post-diagnosis appropriate care. Finally, high-quality multiplanar and volumetric reformatted CT images greatly improve detection of injury and enhance the understanding of mechanisms of trauma-related abnormalities.

Learning Objectives

1. To discuss epidemiology, mortality – morbidity, significance, pathophysiologic features and mechanisms of injury in blunt chest trauma
2. To discuss the typical radiologic findings as well as pitfalls associated with the wide spectrum of types of injury in the thorax, including injury of the lung parenchyma, trachea and airways, aorta (and aortic vessels), heart and pericardium, esophagus, pleura, diaphragm and thoracic wall. Possible coexistence of multiple types of injury is stressed
3. To review the advantages and diagnostic impact of CT/MDCT for selected injuries over other modalities and discuss recommended imaging protocols and algorithms

PULMONARY EMBOLISM, PULMONARY HYPERTENSION

G. Aviram, Tel Aviv/IL

Description

Acute pulmonary embolism (PE) is a common, potentially fatal disease. PE often presents with nonspecific symptoms of dyspnea and chest pain, and thus imaging plays a paramount role in its diagnosis.

CT pulmonary angiography (CTPA) is currently the modality of choice for acute PE diagnosis. Optimization of the CTPA protocol allows reduction of contrast and radiation doses without reducing its high accuracy. CTPA can also contribute to immediate risk stratification and management decisions by revealing findings which are consistent with right ventricular dysfunction.

Another cause of exertional dyspnea, which is associated with an increased morbidity and mortality, is pulmonary hypertension (PH). PH encompasses a large variety of diseases and is classified into five World Health Organization (WHO) groups according to clinical presentation, pathological findings, hemodynamic characteristics, and treatment strategy. Broadly, PH can be thought of as from "pre-capillary" or "capillary" abnormalities of pulmonary vasculature (WHO groups 1,3,4,5) or being from "post-capillary" from left heart disease (WHO group 2), which is believed to be the most common cause of PH, given the high prevalence of left heart disease. Chronic PE is another cause of PH, where imaging plays a major role in diagnosis. Common CT signs of PH include dilatation of the pulmonary trunk, enlargement of

the right heart chambers, reflux of contrast to the inferior vena cava and the hepatic vein and mosaic perfusion of the lung parenchyma. Treatment strategies vary greatly in relation to PH etiology, hence, advancing knowledge on the specific imaging characteristics of the various PH groups can contribute to PH classification and patient management.

ACCREDITATION

UEMS – CME ACCREDITATION

The ESTI Winter Course 2022, Reykjavik, Iceland, 08/12/2022-10/12/2022 has been accredited by the European Accreditation Council for Continuing Medical Education (EACCME®) with 11 European CME credits (ECMEC®s). Each medical specialist should claim only those hours of credit that he/she actually spent in the educational activity.

Through an agreement between the Union Européenne des Médecins Spécialistes and the American Medical Association, physicians may convert EACCME® credits to an equivalent number of AMA PRA Category 1 Credits™. Information on the process to convert EACCME® credit to AMA credit can be found at www.ama-assn.org/education/earn-credit-participation-international-activities.

Live educational activities, occurring outside of Canada, recognised by the UEMS-EACCME® for ECMEC®s are deemed to be Accredited Group Learning Activities (Section 1) as defined by the Maintenance of Certification Program of the Royal College of Physicians and Surgeons of Canada.

Breakdown of ECMEC®s per day:

8.12.2022	3.00
9.12.2022	5.00
10.12.2022	3.00

DISCLOSURE STATEMENT

POTENTIAL CONFLICT OF INTEREST DISCLOSURES

It is the policy of ESTI (European Society of Thoracic Imaging) to ensure balance, independence, objectivity, and scientific rigour in the course programme. Knowledge of possible relationships with sponsors of any kind is mandatory in order to reinforce the educational and scientific message and to relieve any suspicion of bias.

Any potential conflict of interest involving the organising committee should be made known so that the audience may form their own judgements about the presentation with a full disclosure of the facts. It is for the audience to determine whether the presenter's external interest may reflect a possible bias in either the work carried out or the conclusions presented.

The ESTI Winter Course 2022 Organiser, Dr. Anagha P. Parkar, did not disclose any relationships.

GENERAL INFORMATION

Course Venue
Fosshotel Reykjavík
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Iceland

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Onsite Office
In case of any questions, kindly consult the registration desk, staff persons will be happy to assist you.

Registration Desk Opening Hours

Thursday, December 8	11:30-18:00
Friday, December 9	07:30-16:30
Saturday, December 10	08:00-13:00

Course Language
The course will be held in English. No simultaneous translation will be offered.

Registration fee for delegates includes
- admittance to all sessions
- admittance to the industry symposia
- admittance to the industry exhibition
- course programme including abstract syllabus
- certificate of attendance
- coffee breaks & lunch

Mobile Phones
Please do not forget to switch off your mobile phones before entering any of the lecture room.

Breaks
Complimentary coffee, tea and refreshments will be served during the official coffee breaks to all meeting delegates. Lunch is offered during the lunch breaks.

Recording
Photo-, video- or audio-recording of any sessions or presentations is not allowed without the speaker's/organiser's prior written permission.

Future Meeting Desk
This area offers you an overview of future meetings in the field of radiology and related disciplines, from all over the world. Feel free to contribute flyers and posters to promote your own meetings and courses.

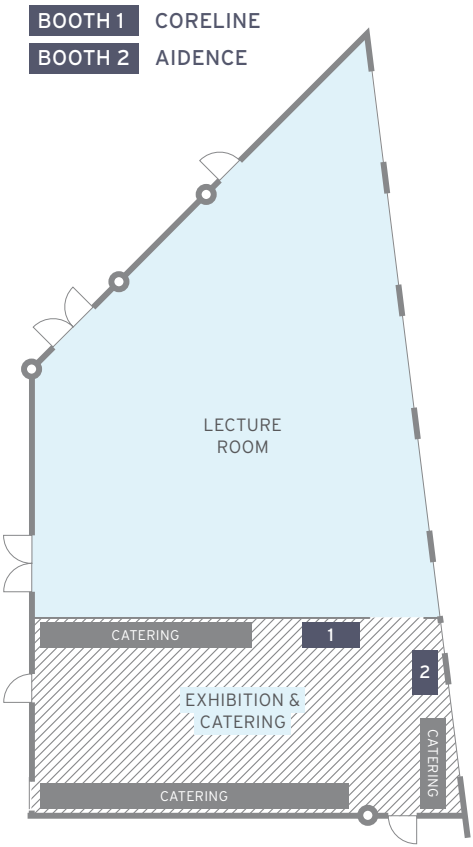
Onsite Payment
Onsite payment can only be made by credit card (Visa or Mastercard) or in cash (Euro). Please be informed that no other payment facilities such as debit cards, cheques, etc. will be accepted.

Certificate of Attendance
Each participant who attended the live event will receive a confirmation of attendance end of December. The CME credits are only available for those who successfully complete the evaluation.

CME Certificate
Persons who attended the live event (December 8-10) AND who successfully evaluated the congress will receive their UEMS CME certificate end of December.

QR code for UEMS online evaluation

Floor plan



Safety

The safety of all congress delegates and participants is of utmost importance to ESTI. Security measures and precautions at the ESTI Winter Course venue have been tightened to ensure maximum security for all attendees. Badges must be worn visibly on the congress grounds at all time. ESTI reserves the right for staff to check participants' identification upon admission to and/or inside the course venue. Participants may at any time be requested to present adequate proof of identity in the form of a passport, driver's license, national or military identification or student ID. Documents for the proof of identity must include a photograph and signature.

Covid-19 rules

No specific rules and regulations apply for ESTI Winter Course 2022 attendees.

Disclaimer/Liability

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INDUSTRY SPONSORED SYMPOSIA

THURSDAY, DECEMBER 8, 2022, 14:05-14:50

Moderator: A.P. Parkar, Bergen/NO

14:05 **When progressive isn't progress: Progressive Pulmonary Fibrosis**
H. Prosch, Vienna/AT

14:45 **Q&A**

FRIDAY, DECEMBER 9, 2022, 11:20-12:05

Moderator: F. Gleeson, Oxford/UK

11:20 **Using artificial intelligence for oncological thoracic imaging: Is it a true addition?**
M-P. Revel, Paris/FR

Lunch will be served after the symposium from 12:05-13:00.

SATURDAY, DECEMBER 10, 2022, 10:15-11:00

Moderator: A.P. Parkar, Bergen/NO

10:15 **Biggest change in 20 years: Update on lung cancer screening programs at European level**
S. Schmidt, Forchheim/DE

10:30 **Screening and early detection of cardiothoracic diseases: A radiological perspective**
R. Vliegenthart, Groningen/NL

10:45 **Q&A**

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