Abstracts

46. Jahrestagung der Österreichischen Gesellschaft für Pneumologie
6. Jahrestagung der Österreichischen Gesellschaft für Thoraxchirurgie
29. September – 1. Oktober 2022

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FÄLLE DES JAHRES 2022

F01 | N. bronchi – What else?

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Patientencharakteristik und Anamnese: 40jähriger Patient, seit 14 Tagen bestehende Fieberschübe, Appetitminderung. Durch den Hausarzt wurde Amoxicillin plus Cefaclor verabreicht - ohne Besserung. Im Heimatkrankenhaus wird ein Thorax-CT veranlasst, in welchem eine tumorsuspekte Konolidierung im rechten Unterlappen sowie eine rechtshiläre und infracarinal Lymphadenopathie beschrieben wird. Blutkulturen bleiben ohne Keimnachweis. Laborchemisch findet sich eine mäßige CRP-Elevation mit milder Leukozytose, BSG sowie LDH eleviert. Anamnestisch besteht ein chron. Nikotinabusus mit kum. 25 py. Ein rezenter Auslandsaufenthalt und Zeckenbisse werden verneint.

Diagnostik und Diagnose: Im weiterführenden PET-CT zeigt sich ein FDG-Hypermetabolismus im Bereich der Konolidierung sowie der rechtshilären und infracarinalen Lymphknoten.

Bei hochgradigem Malignitätsverdacht wird eine Bronchoskopie veranlasst. Der histologische Befund zeigt Granulome mit Epitheloidzellsaum, zentralen Nekrosen und eine lymphozytäre Infiltration. Der panbakterielle DNA-Nachweis (16S rRNA Gen) aus der Gewebeprobe ergibt Francisella Tularensis DNA.

Bei normalisierten Infektparametern und fehlendem Fieber wird auf eine weitere Antibiose verzichtet. In der CT-Thorax-Kontrolle nach 4 Wochen finden sich die pathologischen Veränderungen deutlich rückläufig. Als wahrscheinlichste Infektquelle vermuten wir eine Pausenhütte mit vermehrtem Vorkommen an Mäusen.

In den folgenden Wochen diagnostizieren wir weitere Fälle pulmonaler Tularämie.

In den letzten Jahren verzeichnet Oberösterreich eine deutliche Zunahme an Tularämiefällen. (2019:7, 2020:13, 2021:24) (1) (1) Bundesministerium für Soziales, Gesundheit, Pflege und Konsumentenschutz. Jahresstatistik Meldepflichtiger Infektionskrankheiten 2018–2020. Verfügbar online: https://www.sozialministerium.at/Themen/Gesundheit/Uebertragbare-Krankheiten/Statistiken-und-Fallzahlen.html

F02 | Wie viel Arzt verträgt ein Patient?

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Patienten Charakteristik, Anamnese und Symptome: Im November 2017 kommt ein 49-jähriger Mann in die zentrale Notfallaufnahme des Klinikum Klagenfurt. Er klagt seit längerer Zeit über Atemnot sowie ein Ziehen im Bauch.

Diagnostik und Diagnose: Die Computertomographie zeigt einen verlegten Mittellappenbronchus mit Tumordacht (unbekanntes Primum) sowie einen Dünndarmileus mit Verdacht auf eine Perforation.

Therapie: Durch die Viszeralchirurgen wird eine Laparotomie durchgeführt. In den nächsten Tagen folgt eine Bronchoskopie, der Bauchdeckenverschluss, das respiratorische Weaning und die Extubation. Nach Tagen wird der Patient respiratorisch insuffizient, muss reintubiert werden und benötigt eine venovenöse EKMO. Hierbei kommt es zu einer Perforation der Vena anonyma durch die obere Kanüle in das Perikard, sodass der Patient nach Beginn der EKMO Therapie eine Perikardtamponade entwickelt, durch den Herzchirurgen notfallmäßig auf der Intensivstation sternomitiert und weiter versorgt wird (Umbau auf veno-arterielle EKMO, Venennaht). Der Blutverlust wird mit 14 Erythrozytenkonzentraten ausgeglichen. Nach Stunden stabilisiert sich der Patient, sodass die EKMO wieder auf venovenös umgebaut werden und der Sternumverschluss erfolgen kann. 6 Tage später kann die EKMO ausgebaut werden. Kurz darauf erfolgt eine Dilatationstracheotomie. Im weiteren Verlauf wird der Patient hämodynamisch instabil und entwickelt eine Perikardtamponade. Es folgt die notfallmäßige Perikardfensterung sowie Anlage von Bülau Drains beidseits. Beim Legen des linken Drains kommt es durch den Kauter zu einer Flamme, welche sofort gelöscht wird, jedoch Verbrennungen über 5 % der Körperoberfläche verursacht. Nach Tagen folgt die Meth-Graft-Deckung durch die plastischen Chirurgen.

In Summe verbringt der Patient 6 Wochen auf der Intensivstation, nach 2 Monaten stationärem Aufenthalt im Klinikum Klagenfurt folgt eine weitere Woche im KH Laas. 6 Monate später wird ein Platteneipethelkarzinom des Mundbodens bestätigt. Der Patient lehnt eine Operation ab, unter Radio-Chemotherapie kommt es zur Regredienz.

Abstract F01 | Abb. 1
Ein seltene Ursache für nächtlichen Husten und rezidivierendes Erbrechen – Diagnostisches Work-up anhand aktueller Leitlinien

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Patienten Charakteristik, Anamnese und Symptome: Die 7-jährige Patientin stellte sich erstmals in unserer Lungenambulanz mit seit 10 Monaten bestehendem nächtlichen Husten und schleimigen Erbrechen vor. Therapieversuche mit Beta-2-Sympathomimetika, inhalativem Kortison, Leukotrien-Rezeptorantagonisten und Protonenpumpenhemmern waren bisher erfolglos. Das Mädchen erhielt anamnestisch wiederholt antibiotische Therapie aufgrund revidierender Pneumonien, worunter es zwar zu einer Rückbildung der Infiltrate, jedoch zu keinem Sistieren der Symptome kam. Weiters kam es zu einem Gewichtsverlust von knapp 4 kg, daher wurde Leitlinienkonform die weitere Diagnostik bei chronischem Husten und den „red-flags“ Gewichtsverlust und rezidivierende Pneumonien eingeleitet. Laboruntersuchungen, inklusive Allergietest, und Schweißtest lieferten keine aufschlussreiche Erklärung für die Beschwerden.

Diagnostik und Therapie: Das Lungenröntgen war bland. Die Lungenfunktion zeigte jedoch eine auffällige Fluss-Volumen-Kurve und brachte den ausschlaggebenden Hinweis auf eine intrathorakale Stenose. Dazu passend berichtete die Kindsmutter von seit längerer Zeit bestehender Schluckproblematik mit nächtlichem Hochwürgen von Schleim und unverdauten Nahrungsresten. In der Videostroboskopie fand sich eine Enge zwischen dem freien Rand der Epiglottis und der Rachenhinterwand. Sonographisch fiel eine massive Dilatation des Ösophagus bis hin zum unteren Ösophagus sphinkter auf. Angedeutet konnte man eine propulsive Peristaltik und inkomplette Passage von Flüssigkeit durch den Sphinkter erkennen, dem Bild einer Achalasie entsprechend.

Nach Überstellung an die Universitätsklinik zeigte sich im Schluckröntgen mit Kontrastmittel ebenfalls die typische „Sektglasform“ mit prästenotischer Dilatation. Während des Schluckakts war neben der nur zeitweise fadenförmigen gastrosophagealen Passage auch eine ösophageale Kontrastmittelaussparungen, im Sinne von impaktierten Speise- und manifest der Stenose des ösophagogastralen Überganges. Sowohl makro- als auch mikroskopische fanden sich keine Entzündungszeichen, somit konnte eine Gastroösophageale Refluxkrankheit (GERD) oder eine Eosinophile Ösophagitis (EoE) mit postentzündlicher Stenose ausgeschlossen werden. Weiters ist eine Ösophagusmanometrie zur Diagnosesicherung vor einer definitiven chirurgischen Therapie geplant.

Diagnose: Achalasie mit rezidivierenden Aspirationspneumonien

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Abstract F04 | Abb. 1

F04 | Fokus Interdisziplinarität – Wenn der Zahnarzt dein bester Zuweiser wird: Teil I

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Patienten Charakteristik, Anamnese und Symptome: Frau, 53-jährig, Zahnarztbesuch zur Kariesexkavation. Während der Behandlung löste sich der Bohrkopf und die Patientin aspiriert den Fremdkörper reflektorisch. Zwei Tage später Vorstellung zur weiteren Therapie.
**Diagnostik und Diagnose:** CT: Fremdkörper mit 2,5 cm Länge im medialen Segmentbronchus des posterobasalen Unterlappensegmentes rechts.

**Bronchoskopie:** Die Spitze des Bohrers mittels ultradünnen Bronchoskop darstellbar. Die Bergung mit Körbchen, Schlinge oder Zange ist jedoch nicht möglich. Bedingt durch den zu dünnen Arbeitskanal ist der Einsatz des Magneten oder des Katheters ebenfalls nicht möglich.

**Therapie:** Bei fehlenden interventionellen Therapiemöglichkeiten wird die Indikation zur operativen Versorgung mittels VATS mit Wedgeresection gestellt. Die Lokalisation wird intraoperativ mithilfe der Fluoroskopie (C-Bogen) aufgesucht.

**Konklusion:** Bei Fremdkörperaspiration sollte so früh als möglich eine Bronchoskopie durchgeführt werden, um eine Dislokation nach peripher zu vermeiden. Hierbei können eventuell nicht-konventionelle Methoden in Betracht gezogen werden (z.B. starre Bronchoskop mit Teleskop-Technik zur Einführung dünner Endoskope).

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1. Goyal R, et al. Lung India. 2016;33:664-666.

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**F06 | Hämoptoe nach COVID-19: ein diagnostisches Rätsel**

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**Patientencharakteristik, Anamnese, Symptome:**

Vom auswärtigen Krankenhaus an die pneumologische Abteilung des LKH Natters zugewiesen: Patientin 54-Jährige mit bekanntem Mb. Parkinson, nach Fremdkörperaspiration und mehrfachen erfolglosen bronchoskopischen Bergeversuchen. Anlässlich einer Zahnbehandlung aspirierte die Patientin eine Zahnimplantatsschraube und verschluckte den dazugehörigen Dentalschrauber. Der Dentalschrauber ging via naturalis ab, die Implantationsschraube und Erythrozytenkonzentrate eine wiederholte bronchoskopische Blutungstillung erforderlich, gefolgt von einer video-assistierten thorakoskopischen Ligatur kaliberstarker Segmentarterien des linken Ober- und Unterlappens.

Zunächst wurde die COVID-19 Pneumonie als Ursache für die Hämoptysen unter laufender Blutverdünnungstherapie attestiert. Radiologisch zeigten sich ausgeprägte Milchglastümmer und Infiltrationen der linken Lunge, sowie Hinweise für eine pulmonale Hypertonie. Nach Stabilisierung der Hämoptysen konnte der Patient schließlich von der Beatmung entwöhnt und auf die Normalstation verlegt werden. In Folge wurde mittels Rechtsherzkatheter die pulmonale Hypertonie bestätigt und bei neuerlicher Durchsicht der initial durchgeführten CT Bilder eine Pulmonalvenenstenose suspiziert, die mittels gezielter Computertomographie der Pulmonalvenen bestätigt werden konnte.

**Therapie:** Zur kausalen Therapie wurde eine Rekanalisierung der Pulmonalvenen geplant. Zunächst soll ein interventionelles Verfahren vereinbart. Bei frustranem Eingriff ist die Implantationsschraube mit dem Katheter mobilisiert, ein Dentalschrauber ging via naturalis ab, die Implantationsschraube und Erythrozytenkonzentrate eine wiederholte bronchoskopische Blutungstillung erforderlich, gefolgt von einer video-assistierten thorakoskopischen Ligatur kaliberstarker Segmentarterien des linken Ober- und Unterlappens. In Folge wurde mittels Rechtsherzkatheter die pulmonale Hypertonie bestätigt und bei neuerlicher Durchsicht der initial durchgeführten CT Bilder eine Pulmonalvenenstenose suspiziert, die mittels gezielter Computertomographie der Pulmonalvenen bestätigt werden konnte.

**Differentialdiagnostik:** Tuberkulose, Vaskulitis, Pulmonalembolie und ein malignes Geschehen konnten ausgeschlossen werden.

**Therapie:** Zur kausalen Therapie wurde eine Rekanalisierung der Pulmonalvenen geplant. Zunächst soll ein interventionelles Verfahren vereinbart. Bei frustranem Eingriff ist die Implantationsschraube mit dem Katheter mobilisiert, ein Dentalschrauber ging via naturalis ab, die Implantationsschraube und Erythrozytenkonzentrate eine wiederholte bronchoskopische Blutungstillung erforderlich, gefolgt von einer video-assistierten thorakoskopischen Ligatur kaliberstarker Segmentarterien des linken Ober- und Unterlappens. In Folge wurde mittels Rechtsherzkatheter die pulmonale Hypertonie bestätigt und bei neuerlicher Durchsicht der initial durchgeführten CT Bilder eine Pulmonalvenenstenose suspiziert, die mittels gezielter Computertomographie der Pulmonalvenen bestätigt werden konnte.

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Hypertonie (PVR > 3 Wood, sPAP 110 mmHg) mit deutlicher Episode eine Reanimation notwendig. elektrophysiologische Eingriffe bei rezidiv tachykardem Vor- der Patient nie auskorrigiert werden. Seit 2018 waren mehrfach und Transposition der großen Gefäße. 1984 wurde ein Pulmo- Venticle DILV), subaortaler Ausflusskammer, zwei AV- Klappen
sehen. die oft multiplen Voroperationen am Herzen als zu hoch ange-
allerdings wurde früher das Risiko für solch einen Eingriff durch
kommt theoretisch eine Herz/Lungentransplantation in Frage, für diese Patienten
zu einer Chronifizierung und zur Entwicklung eines fixierten,
Leben führen. In einer geringen Anzahl kommt es allerdings
Patienten nach korrigierenden Operationen ein ganz normales
Herzfehlbildungen bei der Geburt können die meisten dieser
Großteil der „Herzkinder“ heute erwachsen. Trotz schwersten
Behandlungsmethoden angeborener Herzfehler werden der
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results, hemodynamics, and complications after combined
heart and lung transplantation. Circulation 1985;71:919–28

Kinder mit angeborenem Herzfehler werden erwachsen – neue Herausforderung der Herz-Lungentransplantation

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Patienten Charakteristik: Durch die Verbesserung in den Behandlungsmethoden angeborener Herzfehler werden der Großteil der „Herzkinder“ heute erwachsen. Trotz schwerster Herzfehlbildungen bei der Geburt können die meisten dieser Patienten nach korrigierenden Operationen ein ganz normales Leben führen. In einer geringen Anzahl kommt es allerdings zu einer Chronifizierung und zur Entwicklung eines fixierten, therapierefraktären Lungenhochdrucks. Für diese Patienten kommt theoretisch eine Herz/Lungentransplantation in Frage, allerdings wurde früher das Risiko für solch einen Eingriff durch die oft multiplen Voroperationen am Herzen als zu hoch ange-

Anamnese und Symptome: Vorgestellt wird ein 40-jähriger Patient mit einem univentrikulären Herzen (Double Inlet Left Ventricle DILV), subaortaler Ausflusskammer, zwei AV-Klappen und Transposition der großen Gefäße. 1984 wurde ein Pulmonalisbanding zur Palliation durchgeführt, allerdings konnte der Patient nie auskorrigiert werden. Seit 2018 waren mehrfach elektrophysiologische Eingriffe bei rezidiv tachykardem Vorhofflimmern erforderlich, 2021 war aufgrund einer Torres de points Episode eine Reanimation notwendig.

Diagnostik: Es wurde bei dem Patienten bei End-stage Kardiomyopathie und fixierter sekundären pulmonalen Hypertonie (PVR > 3 Wood, sPAP 110 mmHg) mit deutscher Hypoxie und Leistungseinschränkung die Evaluation für die kombinierte Herz-Lungentransplantation durchgeführt [1].

Therapie: Am 05.04.2022 stand ein großen- und blutgruppenkompatibles Spenderorgan zur Verfügung. Es erfolgte En bloc die Herz-Lungentransplantation mit Clamshell-Inzision an der Herz-Lungen-Maschine. Die Nachsorge erfolgt interdisziplinär, primär auf pulmologischem Schwerpunkt. Auf Myokardbiopsie wurde routinemäßig bei guter echokardiographischer Funktion und NT-ProBNP Monitoring verzichtet [2]. In der Drei-Monatskontrolle zeigte sich in der Lungenfunktion ein FEV1 von 3,15 L (70 % vom Soll-Wert, und eine TLC von 5,8 L (80 % vom Sollwert), histologisch konnten in der transbronchialen Biopsie keine Zeichen einer akuten zellulären Abstoßung, (A0, B0) gesichtet werden.

Konklusion: Bei nicht komplett auskorrigerbarem Herzfehler kommt bei der myokardialen Erschöpfung und fixierter sekundären pulmonalen Hypertonie eine Herzlungentransplantation grundsätzlich in Frage [3, 4]. Bei gut selektierten Pa-
ten sind die Surveilance Daten mit der isolierten Lungentransplantation vergleichbar [5, 6]. Die enge interdisziplinäre Zusammenarbeit in der Nachsorge ist unentbehrlich.

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Pulmonale Konsolidierungen als Beziehungskiller

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Patienten Charakteristik, Anamnese und Symptome: Ein 38-jähriger Raucher ohne Vorerkrankungen berichtete über ein seit 10 Tagen bestehendes allgemeines Krankheitsgefühl, trockenen Husten sowie rechtshorakale Schmerzen. Fieber oder Dyspnoe wurden negiert. Im klinischen Status zeigten sich bis auf ein gering ausgeprägtes stammbetontes makulopapulöses Exanthem keine Auffälligkeiten.

Diagnostik und Diagnose: Im Aufnahmelabor zeigten sich elevierte Entzündungsparameter (Leukozyten 12,6 G/l, C-reaktives Protein 14,2 mg/dl) sowie ein leicht erhöhtes D-Dimer (1,2 mg/l). Im Thorax-Röntgen kamen flaue Verdichtungen in den Unterfeldern beidseits zur Darstellung. Mittels Angio-CT Thorax konnte eine Pulmonalembolie ausgeschlossen werden, es zeigten sich kugelig konfigurierte Konsolidierungen mit bis zu 35 mm Durchmesser in den Unterlappen dorsoba-
sal beidseits sowie in der Lingula. Es ergab sich kein Hinweis auf eine Immunsuppression (Immunglobuline quantitativ und Lymphozytenanpassung in den Referenzbereich, Hepatitis, und HIV-PCR neg.), sodass eine subakute oder invasive pulmonale Aspergillose ausgeschlossen erschien. Die Aspergillus-spezifischen IgG Antikörper waren aber deutlich positiv, während Galaktomannan im Serum negativ war. Der Quantiferon-Antigenstest sowie die im Hinblick auf Vaskulitis bestimmten ANCA waren ebenfalls negativ. Schließlich konnte durch einen positiven Treponema pallidum Hämaggultinationstest (TPHA) serologisch die Diagnose einer sekundären Syphilis mit hochgradigem V.a. pulmonale Beteiligung gestellt werden. Eine Bronchoskopie mit bronchoalveolärer Lavage im Hinblick auf einen möglichen Direktnachweis von T. pallidum mittels PCR oder Immunhistochemie wurde vom Patienten leider abgelehnt.

**Differentialdiagnosen:*** Pulmonale Aspergillose, Vaskulitis, septische Embolien

**Therapie:** Initial wurde eine empirische antimikrobielle Therapie mit Ampicillin/Sulbactam und Azithromycin eingeleitet. Nach Diagnosestellung erfolgte die wöchentliche Verbreitung eines m. i. Depot-Penicillins (Pen G, Benzathin Einzeldosis 2,4 Mio. IE) für 3 Wochen.

In der ambulanten Kontrolle mit CT-Thorax nach 6 Wochen zeigten die pulmonalen Konsolidierungen bereits deutlich regredient.

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**F10 | Akutes einseitiges Lungenödem**

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**Patienten Charakteristik, Anamnese und Symptome:** Eine 85-jährige Patientin wird mit Rettung ohne Notarztbegleitung auf eine Notaufnahme gebracht. Sie klagt über starke Atemnot, ist dyspnoisch, die Sauerstoffsättigung beträgt 70 %. Im EKG zeigt sich ein Tachykardes Vorhofflimmen 154/Min Erstmastmanifestation. RR 190/126 mmHg. Lt. Telefonat mit der Schwiegertochter hat die Patientin an diesem Abend über Palpitationen geklagt, musste erbrechen und danach hat sich ihr Zustand schnell verschlechtert. Vorbekannte Diagnosen: Arterielle Hypertonie und Z.n MCI mit Sinusstenose 2008. nimmt A- SS, BB, ARA, Amlodipin und Statin ein.

Im Thorax-Ro ist die rechte Lunge verschattet bei leicht vergrößerter Herzhinterwand. Laborchemisch ist eine Leukozytose zu sehen bei grenzwertigem CRP und negative PCT. Troponin ist negativ, D-Dimer leicht erhöht. NT-pro-BNP beträgt 6028 ng/L. Die Patientin bekommt Sauerstoff 10 L/min, Antibiotikum, Betablocker, Digitalis, Amiodaron lV sowie Lasix Perfusor und NOAK-Prophylaxe. Bei niedriger Herzfrequenz erfolgt spät am Abend eine Echokardiographie mit Nachweis einer schweren Mitralinsuffizienz sowie mittelgradigen Aortenstenose bei schwerem PAP 70 mmHg.

Beim persistierendem respiratorischem Distress wird High-Fio2/Sauerstofftherapie mi Airvo begun (High-Flow: 35 L, O2 - 50 %). Pulmonalembolie wurde mittels Pulmonalangiographie ausgeschlossen. Rechts zeigen sich großkalibrige vorwiegend OL-Gefäße, verdickte interlobäre Fissure, septale Linien und Beckige Milchgastrübungen bei mäßigem Pleuraerguss. Erfolgt eine Pleurapunktion – 800 ml Transudat (Light).

Nach Gabe von Amiodaron und Betablocker erfolgt die Kardiodversion im Sinusrhythmus. Eine Thorax-Re Kontrolle (auch nach Pleurapunktion) zeigt unauffälligen Befund.

**Diagnose:** Rechtseitiges OL-betonnetes Lungenödem bei schwerer Mitralinsuffizienz sowie mittelgradiger Aortenstenose während einer Episode vom tachykarden Vorhofflimmern.

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Die Differentialdiagnose der akuten einseitigen Lungenver- 
schattungen ist: Infektion, Aspiration, Pulmonalembole, Lu-
genkontusion/Hämorrhagie, bronchoalveolare Karzinom. Das 
einseitige Lungenödem (wenn nicht postpunktionell) ist meis-
tens als Folge einer Mitralinsuffizienz. Der Regurgitation-Jet 
will vorwiegend gegen die rechte obere Pulmonalvene gerich-
tet. In diesem Fall, das gleichzeitige Bestehen einer Aortenste-
nose bei Tachyarrhythmie mit Herzfrequenz über 150/Min, hat 
die Situation sowohl aggraviert als auch akzeleriert.

Das Kennen dieser Sonderform ist wichtig - bei der Patien-
tin wäre eine sofortige elektrische Kardioversion eine schnelle 
Problemlösung.

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Wir berichten über einen seltenen Fall eines Patienten mit schwerer Trachealverletzung durch Perforation mit einer Stahlstange im Rahmen eines Arbeitsunfalles. Der gesamte Fall wurde videodokumentiert und wird im Rahmen der Präsentation detailliert im Video dargestellt.

Wir berichten über einen 32-jährigen männlichen Patienten, welcher im Rahmen eines Arbeitsunfalls auf einer Baustelle so unglücklich gestolpert war, dass bei diesem eine Baustahlstange oberhalb des Jugularums durch die Trachea in die rechte Thoraxhöhle eingedrungen war. Der Patient wurde nach Erstversorgung und Kürzen der Stahlstange durch die Feuerwehr vor Ort intubiert bei uns in den Schockraum eingeliefert. Im Rahmen der Schockraumversorgung kam es zum Auftreten eines Spannungs-pneumothorax, weshalb der Patient eine Thoraxdrainage erhielt. Die prätherapeutische Diagnostik konnte den Verlauf der Stahlstange nicht sicher klären, da durch die Artefaktbildung eine Computertomografie nicht möglich war. Das Übersichts-Thoraxröntgen war nicht konklusiv.

Da bei dem Patienten eine Verletzung der Trachea, der großen Gefäße, sowie der rechten Lunge möglich war, wurde der Patient notfallmäßig unter Bereitschaft der Herz-Lungen-Maschine über eine Sternotomie operiert. Im Rahmen der Exploration zeigte sich eine komplette Perforation der Trachea von vorne nach hinten durch die Stahlstange, wobei diese unmittelbar paravertebral in die rechte Thoraxhöhle reichte. Da eine Versorgung der Trachealverletzung aufgrund des instabilen Zustandes des Patienten in Anpnoe nicht möglich war, wurde der Patient an die Herz-Lungen-Maschine genommen.

An der Herz-Lungen-Maschine wurde schließlich die Trachea eröffnet und die Hinterwand und Vorderwand vernäht. Intraoperativ konnte eine Verletzung des Ösophagus ausgeschlossen werden. Auch war eine Verletzung der großen Gefäße (Vena brachiocephalica und Truncus brachiocephalicus) der unmittelbar daneben eingedrungenen Stahlstange nicht vorhanden.

Nach Abgehen von der Herz-Lungen-Maschine wurde die Trachea eröffnet und die Hinterwand und Vorderwand vernäht. Intraperativ konnte eine Verletzung des Ösophagus ausgeschlossen werden. Auch war eine Verletzung der großen Gefäße (Vena brachiocephalica und Truncus brachiocephalicus) der unmittelbar daneben eingedrungenen Stahlstange nicht vorhanden.

Nach Abgehen von der Herz-Lungen-Maschine wurde der postoperative Verlauf unauffällig, der Patient konnte am ersten postoperativen Tag extubiert und am dritten postoperativen Tag auf die Normalstation verlegt werden.

Zum Entlassungszeitpunkt, am zehnten postoperativen Tag, bestand bei dem Patienten ein Horner-Syndrom auf der rechten Seite, ansonsten war der Patient beschwerdefrei.

Durch die interdisziplinäre Zusammenarbeit von Herz-Thorax-Chirurgie und Anästhesie konnte bei dem Patienten unter Ausnutzung sämtlicher Maßnahmen zum möglichen Ersatz der Herzfunktion bzw. Atemfunktion eine sichere Versorgung dieser schwerwiegenden Verletzung erreicht werden.

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angeschlungen und V. azygos wurden zur besseren Darstellung intraoperativ in die Vena cava superior (SVC) abgesetzt und anschließend die Oberlappenlobektomie komplikationslos komplettiert. Somit wurde im Rahmen einer onkologischen Lungenteilresektion die Bronchusruptur mit einer Inzidenz von 0.8–0.1% zu den seltenen Herzfehlern gezählt [1–3].

Therapie: In unserem Fall bestätigte sich die suszipierte Anomalie intraoperativ. Die drei Gefäßäste mit Mündung in die SVC wurden abgesetzt und anschließend die Oberlappenlobektomie komplettiert. Somit wurde im Rahmen der onkologischen Operation gleichzeitig der Zufallsbefund der Lungenvenenfehlmündung saniert und der Patient bei unaufgefordertem postoperativen Verlauf am 3. postoperativen Tag entlassen.

Eine PAPVR wird häufig nicht prä- sondern erst intraoperativ als solche erkannt. Die Gefäßpräparation erschweren kann [4–6]. Außerdem wird von einer Assoziation von PAPVR mit bronchialen Fehlbildungen berichtet [7]. Ein genaueres Studium der Bildgebung ist daher unverzichtbar vor thoraxchirurgischen Eingriffen und bei Verdacht auf Lungenvenenfehlmündung sollte auf mögliche bronchiale Besonderheiten genau geachtet werden.

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F15 „Picken statt Flicken“ – „Erste-Hilfe“ wenn der Bronchus reißt

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Anamnese: Ein 39-jähriger Mann wird bei Forstarbeiten von einem Baum getroffen. Es gelingt ihm trotz schwerer Verletzungen einen Notruf abzusetzen. Er wird umgehend in ein nächstgelegenes Spital transportiert, mit Pneumothorax beidseits, Mediastinalämphysem, Weichteilämphysem und mehreren Frakturen.

Diagnostik: Im CT Thorax wird der Verdacht auf eine Ruptur des rechten Oberlappenbronchus gestellt. Daher erfolgt die Transferierung an die pneumologische Abteilung des UK Krems zur Bronchoskopie.

Therapie: Bronchoskopisch bestätigt sich die Verdachtsdiagnose einer Bronchusruptur. Es zeigt sich ein tiefer Schleimhaut-Riss vom Eingang des posterioren Oberlappensegmentbronchus bis hin zum anterioren Oberlappen-Bronchus, entlang der Pars membranacea. Die Untersuchung wird im Beisein der Thorax-Chirurgen durchgeführt und die Therapieoptionen werden gemeinsam besprochen: ob eine Wundnaht möglich wäre oder eine Oberlappen-Lobektomie notwendig ist.

Abstract F14 | Abb. 1 Einmündung von Oberlappen(OL)-Gefäßen in die Vena cava superior (SVC), die 3 OL-Gefäße und V. azygos wurden zur besseren Darstellung intraoperativ angeschlungen.
kann auf Grund der Art und Lage der Verletzung nicht eindeutig abgeschätzt werden. Auch eine Pneumonie unterschied von Ultima Ratio ins Kalkül gezogen werden. Da der Patient klinisch stabil ist und noch keine wesentlichen Entzündungsparameter vorliegen, wird ein individueller konservativer bronchologischer Therapieversuch gewählt. Es erfolgt die Applikation eines autologen Fibrinklebers (Vivostat) [1] im Bereich der Risswunde und anschließend wird ein Arndt-Ballon eingebracht und aufgeblockt, um die Wundränder auseinander zu adaptieren. Der Patient wird nach dem Eingriff intubiert und in Allgemeinanäthesie belassen.

**Verlauf:** Im weiteren Verlauf wird die Lage des Arndt-Bloccers mehrmals per Bronchoskop angepasst und schließlich wird der Ballon nach 12 Tagen entfernt, bei vollständigem Verschluss der Wundränder. In einer Abschluss Kontrolle nach 6 Wochen zeigt sich ein ausgezeichnetes Resultat, der Riss ist vollständig verheilt, und eine Operation mit Lungenresektion konnte verhindert werden.

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Scientific Posters

P01 | Evaluation of CD47 and PD-L1 protein expression patterns reveals therapeutic and prognostic implications in small cell lung cancer

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Introduction: Pharmacological inhibition of the immune-checkpoint molecule CD47 has shown promising results in preclinical small cell lung cancer (SCLC) models, whereas anti-PD-L1 inhibitors have been recently implemented in the standard-of-care of advanced-stage SCLC patients. However, the clinical relevance of both CD47 and PD-L1 expression patterns has not yet been widely investigated in SCLC.

Methods: Proteomic analysis was performed in n=26 human SCLC cell lines and immunohistochemistry (IHC) was conducted on surgically resected specimens of n=194 Caucasian SCLC patients collected from two participating European thoracic centers. Ultimately, protein expression patterns were investigated and correlated with the clinical data of the study cohort.

Results: Both CD47 and PD-L1 were detectable in all investigated SCLC cell lines by proteomics. However, protein expression of CD47 was significantly higher (p<0.0001) in comparison to PD-L1. In accordance, IHC revealed high tumoral CD47 expression with 44.6% positivity among the tissue samples (vs. 9.6% total tumoral PD-L1 positivity). Meanwhile, the tumor-associated stroma showed positive PD-L1 expression in 59.6% of the cases. Moreover, stromal PD-L1 presence significantly correlated with longer OS (vs. PD-L1 negative stroma; median OSs were 42 vs. 14 months, respectively, p=0.003) and was confirmed as an independent predictor of favorable outcome upon multivariate analysis (HR 0.530, CI 95% 0.298-0.943, p=0.031).

Conclusions: CD47 shows a remarkably high expression while PD-L1 is weakly expressed in SCLC tumor cells. Consequently, clinical evaluation of anti-CD47 treatment is highly recommended in SCLC. Of note, stromal PD-L1 expression may indicate a prognostically favorable outcome in SCLC patients. Additional studies are warranted to confirm our findings and to further investigate the role of CD47 and PD-L1 in SCLC.

P02 | Changes in lung ultrasound of post-COVID-19 patients after follow-up rehabilitation

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Introduction: Post-COVID-19 patients often suffer from long-term consequences of the disease. A variation of over 100 long-covid-symptoms has already been found (1). Lung ultrasound examinations can be performed to monitor the progress of post-COVID-19-patients. This typically involves quantifying reverberation artifacts and locating lung consolidation (2). This thesis addresses the following research question: To what extent does lung ultrasound of post-COVID-19-patients change after follow-up-rehabilitation one year after first examination?

Methods: This retrospective analysis is based on LUS images on two occasions:

At time zero (2020) after acute infection and at time one (2021) during follow-up rehabilitation. A 12-zone protocol was carried out, which can be used in the acute and follow-up setting (3). The LUS scores are thus comprised of values from six different lung localisations per side. The values are then added together - the higher, the worse the ventilation (4).

For this purpose, in addition to lung consolidations, particular attention was paid to comet tail artifacts for calculating the LUS scores. These comet tail artifacts arise from a fragmented pleural line whereas b-lines are characterized by a normal pleural line (5).

Results: The results show that the LUS score decreased significantly (p<0.001) from 2020 to the second examination in 2021.

The mean LUS score decreased from 18 points to 8. This represents a reduction in the mean score of almost 45%. A final LUS score of 0 points was nevertheless not achieved by any person under examination.

Discussion and conclusion: With a p-value of less than 0.001, the difference between LUS score at time 0 and time 1 is statistically evident.

One year after the first examination, a significant improvement in lung ultrasound imaging is evident. A correlation in clinical status has yet to be evaluated.

Literature at the author.
P03 | ArtiQ.PFT: AI-powered decision support for the diagnosis of lung diseases: does it help the pulmonologist to be more accurate?

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**Background:** ArtiQ.PFT (ArtiQ NV, Belgium) is an Artificial Intelligence (AI) based software that helps physicians in the interpretation of pulmonary function tests (PFTs). It provides an automated description of the lung function according to the latest guidelines and uses AI to calculate disease probabilities to support the diagnostic process.

**Methods:** A retrospective survey is currently in progress quantifying the impact of ArtiQ.PFT on both the diagnostic accuracy and the next steps that are considered for such a patient. 60 cases (Healthy, Asthma, COPD, ILD, NMD, OBD, PVD, TD) are presented to 19 pulmonologists from 3 different countries (Austria, Switzerland, and Romania). For each case, the full lung function report (spirometry, body plethysmography, diffusion) and a short anamnesis are provided. Pulmonologists provide a primary and up to three differential diagnoses per patient. This step is performed once without and once with the support of ArtiQ.PFT.

**Results:** Our preliminary results demonstrate that participants gave on average 2.1 diagnoses and this number was similar whether they were supported by AI or not. For this number of considered diagnoses the use of AI improves the diagnosis prediction by 17.0% (59.0% versus 76.0%). When looking only at the primary diagnosis, a similar observation can be done: the use of AI improves the detection by 18.9% (43.9% versus 62.8%). Finally, the confidence physicians have about their diagnosis (a score from 1 to 5) is slightly increased when using ArtiQ.PFT (3.5 to 3.6).

**Conclusions:** This survey is still in progress and more complete and new results will be shared with the community (e.g., impact on the consideration of next steps in the patient trajectory). These intermediate results already indicate that AI (ArtiQ.PFT) could support pulmonologists in the diagnostic process when interpreting PFTs.

P04 | What does evidence change? Effects of a fact box on Austrian pneumologists’ and radiologists’ judgment about lung cancer screening’s benefits and harms

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**Introduction:** Lung cancer screening (LCS) using computed tomography reduces lung cancer mortality but not overall mortality. In addition, it leads to false-positive results and overtreatment. Given the delicate benefit-to-harm ratio, doctors need to understand LCS’s potential benefits and harms to initiate shared decision-making with their patients. The study aimed to determine 1) how many doctors recommend LCS, 2) what they know about its benefits and harms, and 3) if being presented with evidence-based data in a fact box format would improve their knowledge about LCS.

**Methods:** We performed a prospective survey study by emailing an online survey to pneumologists and radiologists. First, we asked participants about their current recommendation rates of LCS. Second, we asked a set of knowledge questions about LCS’s benefits and harms. Third, participants received a fact box containing the actual scientific evidence on LCS’s effectiveness. Finally, we repeated the initial knowledge questions.

**Results:** 350 pneumologists and 623 radiologists were contacted. 83(24%) and 53(9%) responded. 33% of participants recommend LCS due to their belief in mortality reduction and patients’ expectations. 60% believed that the benefits outweigh the harms of LCS. Seeing the fact box significantly increased the number of doctors providing an estimate within the range of evidence-based data for lung cancer mortality with LCS (17% before vs 74% after, p = .024) and without LCS (10% before vs 74% after, p = .024). Similar improvements were observed for estimates of false-positive results and overtreatment.

**Conclusions:** Among pneumologists and radiologists, one out of three recommends LCS, and two out of three believe that LCS has more benefits than harms. Seeing the evidence-based data as a fact box considerably improved the proportion of doctors who correctly understood the ratio of benefits and harms of LCS afterwards, which is the fundament for initiating an evidence-based shared decision-making process.
Remodeling of pulmonary arteries, airways and parenchyma in end-stage COPD patients with severe pulmonary hypertension

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Introduction: In large cohorts of end-stage COPD patients, severe pulmonary hypertension was associated with less severe impairment of pulmonary function and the term “pulmonary vascular phenotype” has been introduced for these COPD patients. In this study, we analyzed the association of pulmonary hypertension (PH) severity, as derived from right heart catheterization, with vascular, parenchymal and airway remodeling in explant lungs of COPD patients undergoing lung transplantation.

Methods: We assessed vascular and airway remodeling as well as mean interseptal distance in lung tissue samples from explant lungs from end-stage COPD patients, with i) severe PH (SevPH- COPD), as well as moderate PH (MildPH- COPD) and iii) no PH (NoPH- COPD). Idiopathic PAH (IPAH) and healthy donor lungs were used as comparators. Group comparisons were made using mixed models and Spearman correlations.

Results: We included n = 18 SevPH- COPD (mPAP = 43 [39-45] mmHg), n=18 MildPH- COPD (mPAP = 28 [24-31] mmHg), n=5 IPAH (mPAP = 72 [65-91] mmHg) and n=10 donors. We observed gradual thickening of (neo)intima and media of pulmonary arteries from donor (median 7% of vessel diameter and 17%) to NoPH- COPD (11% and 16%; p = 0.020 and p = 0.024) to MildPH- COPD (13% and 20%; vs NoPH: p = 0.011 and p < 0.001) to SevPH- COPD (17% and 23%; vs MildPH: p = 0.003 and p = 0.083). Mean interseptal distance, as histological surrogate for emphysema, was negatively correlated with mPAP (p < 0.001; coeff = -0.556) and most prominent in NoPH-COPD (median 281 µm) and MildPH-COPD (279 µm), while it was only moderate in SevPH-COPD (169 µm; vs MildPH: p < 0.001). mPAP was negatively correlated with FEV1% FVC (p = 0.047; coeff = 0.473), but there was no significant correlation between vascular and airway remodeling.

Conclusions: End-stage COPD patients with severe PH present with pronounced vascular remodeling and moderate emphysema as compared to patients with mild or no PH, consistent with the clinical features of the pulmonary vascular phenotype of COPD.

Prostaglandin 15d-PGJ2 is a potent compound for treatment of lung adenocarcinoma

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Background: Lung adenocarcinoma (LADC) belongs to the most frequent and deadliest cancer types worldwide. Patients are mostly asymptomatic at the early stage, thus, LADC is frequently diagnosed at advanced stage, making the surgical excision of the tumor impossible or contra productive. Prostaglandins are biologically active endogenous metabolites of arachidonic acid. Naturally occurring prostaglandin 15-deoxy-Δ12,14-PGJ2 (15d-PGJ2), a final stable degradation product of prostaglandin D2, displays anti-oxidative, anti-inflammatory, insulin sensitizing, and anticancer effects.

Methods: We analyzed the influence of 15d-PGJ2 on phenotype and molecular mechanisms in LADC cell lines (A549, H1299, and H23). After exposure to 15d-PGJ2, cell viability, proliferation and motility assays, as well as fluorescence-activated cell sorting were performed. Immunoblotting was used to detect apoptosis and activation of MAP-kinases. Production of reactive oxygen species (ROS) was measured by fluorescence-based method. Colony-formation and wound-healing assays were used to investigate the effects of 15d-PGJ2 on LADC cell malignancy. Expression levels of potential target genes were determined by RT-qPCR analysis. Ex ovo chorioallantoic membrane (CAM) assay was used as a bridge between in vitro and in vivo models. Knockdown of a NAD+-dependent deacetylase sirtuin 1 (SIRT1) was achieved by sh-RNA methodology.

Results: We identified substantial cytotoxic effects of 15d-PGJ2 on LADC cells. 15d-PGJ2 significantly decreased cell proliferation and migration by inducing early apoptosis and inhibiting cell cycle progression of LADC cells. Scratch-closure and colony formation, as indicators of cell malignancy, were significantly inhibited by 15d-PGJ2. 15d-PGJ2 induced ROS production and MAPK activation in LADC cells. Putative receptors for 15d-PGJ2 (PPARγ, DP1, and DP2) were expressed in LADC cells. 15d-PGJ2 significantly inhibited tumor growth in the CAM model. Knockdown of SIRT1 partially diminished cytotoxic effects of 15d-PGJ2 in vitro.

Conclusions: Naturally occurring prostaglandin 15d-PGJ2 activates ROS-mediated apoptosis and inhibits LADC cell/ tumor growth. Our data suggest SIRT1 as a possible therapeutic target for LADC.
**P07** Galectin-3 drives a cycle of pro-inflammatory and -fibrotic right ventricular remodeling

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**Introduction:** Increased beta-galactoside binding protein Galectin-3 (Gal-3) levels were reported in patients with pulmonary hypertension (PH), which was essential for PH-induced right ventricular (RV) fibrosis development. However, the mechanism underlying Gal-3 pro-fibrotic effects in the RV during PH remain unclear.

**Methods:** Direct effects of Gal-3 on primary human cardiac fibroblasts (CF) and monocyte-derived macrophages (MDM) were evaluated using RT-qPCR, Western blotting and flow cytometry. MDM and CF involvement in RV fibrosis development was further explored using a murine pulmonary artery banding (PAB) model using multicolor imaging and flow cytometry. Pulmonary artery occlusion to 0.3 mm was performed in C57Bl/6j mice, which were randomly allocated after echocardiography to treatment or control group 7 days post operation. Mice received either new generation mineralocorticoid receptor antagonist or vehicle control daily by oral gavage.

**Results:** Stimulation with IL-1β or aldosterone promoted Gal-3 expression in CF approaching high expression levels seen in MDM. Of note, Gal-3 stimulation of MDM upregulated the expression IL-1β manifold. Similar to PDGF-BB, Gal-3 induced proliferation of CF, which involved ERK/AKT phosphorylation and glycosylated integrins, and upregulated transcription of TN-C. Therapeutic treatment with novel non-steroidal mineralocorticoid receptor antagonist (BR4628) blunted the RV fibrosis progression in murine PAB model. BR4628-treated mice exhibited less fibrillar collagen deposition and expression of connective tissue growth factor, in the RV compared to sham treated mice. This went hand in hand with lower Gal-3 mRNA and protein expression in the RV.

**Conclusions:** This study suggests an involvement of both (I) inflammatory and (II) hypertensive initiators of Gal-3 induction in RV fibrosis development. Dual source of Gal-3 and a pro-inflammatory feedback loop represent a central mechanism of driving CF proliferation and extracellular matrix deposition.

**P08** Th2-mediated pulmonary vascular hyperresponsiveness and remodelling in a mouse model of systemic sclerosis associated pulmonary arterial hypertension

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**Background:** Pulmonary vascular constriction and remodelling are features of pulmonary arterial hypertension (PAH). Th2 inflammation in the lung induces pulmonary vascular hyperresponsiveness to vasoconstrictive stimuli. In Fra2 overexpressing mice, a model of systemic sclerosis associated PAH, a strong Th2 signature and pulmonary vascular remodelling were reported. We hypothesised that Th2 driven inflammation in this model leads to pulmonary vascular hyperresponsiveness and remodelling.

**Methods:** In Fra2 overexpressing (transgenic [TG]) and wild-type (WT) mice, pulmonary vascular responsiveness was investigated ex vivo in isolated perfused and ventilated lungs and via wire myography. Pulmonary vascular remodelling was analysed in vivo in WT and TG mice treated with IL-13 blocking antibodies or glucocorticoids.

**Results:** In isolated perfused mouse lungs, mean pulmonary arterial pressure under basal conditions was significantly elevated in TG compared to WT lungs. Hypoxic pulmonary vasconstriction was largely augmented in TG compared to WT lungs. In addition, pulmonary vascular hyperresponsiveness to serotonin was observed in TG lungs. Isolated pulmonary arteries of TG mice showed increased vasoconstriction in response to diverse stimuli such as potassium chloride or the thromboxane A2 analogue U46619, indicating stimulus-independent hyperresponsiveness in pulmonary arteries of Fra2 TG mice.

In vivo, increased vessel wall thickness and muscularisation of small pulmonary vessels was measured in TG mice compared to WT mice. This vascular remodelling was ameliorated by anti-inflammatory treatment using either IL-13 blocking antibodies to specifically target Th2 immunity or general immunosuppression using glucocorticoids.

**Conclusions:** Our data argue for the concept that Th2 driven inflammation induces pulmonary vascular remodelling and pulmonary vascular hyperresponsiveness. We could show that targeting this axis leads to better outcome and is a relevant therapeutic avenue in inflammation-induced vascular pathologies.
The longitudinal impact of body compartments on lung function in children, adolescents, and adults

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Background: Evidence shows associations between body weight and lung function, but the longitudinal effects of specific body compartments and their changes on lung function trajectories remain unclear. We aimed to investigate the influence of body compartments and changes over time on lung function measures, including static lung volumes.

Methods: We investigated 10.602 adults (≥18–82 years) and 1489 children/adolescents (6–18 years) of the population-based LEAD cohort. Lung function by spirometry (FEV1, FVC) and body plethysmography (TLC, RV, FRC) were compared between individuals with different amounts of fat mass index (FMI) and appendicular lean mass index (ALMI) assessed by DXA. Lung function changes in body compartments were assessed after four years.

Results: High ALMI was consistently associated with higher FEV1 and FVC in children/adolescents and adults, and with higher TLC in children/adolescents. In adults, an inverse association existed between FMI and all lung function measures, while children/adolescents with high FMI had higher FVC. In children/adolescents with increasing ALMI, FVC and TLC increased, while in adults with increasing FMI, static lung measures (TLC, RV, FRC) declined.

Conclusions: This study demonstrates the impact of body composition on various lung function measures. Muscle mass influences forced parameters, especially in children/adolescents, while fat mass impacts static lung function measures more strongly. Lung function trajectories should be interpreted considering changes in body compartments.

Abstract P09 | Abb. 1 Lung function change between groups with different appendicular lean mass and fat mass patterns in children/adolescents (left row) and in adults (right row). Shows box plots (medians, first quartile, 1.5x the interquartile range) for z-score change of presented lung function parameters in children/adolescents (6–<18 years) and adults (≥18–82 years, right). Decline: ALMI (FMI, respectively) z-score change < -0.5 z-scores, stable: ALMI (FMI, respectively) z-score change > -0.5 and < 0.5 z-scores, increase: ALMI (FMI, respectively) z-score change ≥ 0.5 z-scores. P-values were calculated by Wilcoxon-rang sum test to test for group differences between ALMI and FMI groups. Bonferroni-Holm correction was applied to all p-values presented. *p<0.01 vs LAMI (FMI, respectively), increase: *p<0.01 vs stable ALMI (FMI, respectively). Abbreviations: ALMI=appendicular lean mass index, FMI=fast mass index, FEV1=forced expiratory volume in 1 second, FVC=forced vital capacity, TLC=total lung capacity, RV=residual volume, FRC=Functional residual capacity

Real-world experience with capmatinib in MET exon 14 mutated non-small cell lung cancer (RECAP)

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Abstracts

Results: Data from 81 patients with advanced MET exon 14 mutated NSCLC treated with capmatinib in first- or later-line therapy were analyzed. Median age was 77 years (range, 48–91), 56% were women, 86% had stage IV disease, and 27% had brain metastases. For all patients the objective response rate (ORR) to capmatinib was 58% (95% CI, 47–69), while it was 68% (95% CI, 50–82) in treatment-naïve and 50% (95% CI, 35–65) in pretreated patients. The median progression-free survival (PFS) was 9.5 months (95% CI, 4.7–14.3), while it was 10.6 months (95% CI, 5.5–15.7) in first-line and 9.1 months (95% CI, 3.1–15.1) in pretreated patients. After a median follow-up of 11.0 months, the median overall survival (OS) was 18.2 months (95% CI, 13.2–23.1). In patients with measurable brain metastases (n = 11) the intracranial ORR was 46% (95% CI, 17–77). Capmatinib showed a manageable safety profile. Grade ≥ 3 treatment-related adverse events included peripheral edema (13%), elevated creatinine (4%) and liver enzymes (3%).

Conclusions: In patients with MET exon 14 skipping mutation, capmatinib shows durable systemic and intracranial efficacy and a manageable safety profile. This analysis confirms previously reported phase II data in a real-world setting.

P11 Characteristics and treatment outcomes in advanced stage non-small cell lung cancer patients with KRAS G12C mutation

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Introduction: About 15% of patients with non-small cell lung cancer (NSCLC) presenting with MET exon 14 skipping mutation have an unfavorable prognosis with standard treatments. Capmatinib is a selective MET-inhibitor, which showed promising efficacy in this patient population in early trials.

Methods: We performed a retrospective efficacy and safety analysis in patients with NSCLC treated with capmatinib in an early access program.
Abstract P11 | Abb. 1 ¹Percentage may not equal to 100 because of rounding; ²including: Alectinib (2), Capmatinib (1), Sotorasib (2); ³Patients who participated in a clinical trial or expanded access program were not included for calculation of systemic therapy specific ORR, OS and TTNT; ⁴ORR was defined as complete or partial response assessed by the treating physicians; patients with unknown response were excluded; ⁵DCR was including CR, PR, or SD; patients with unknown response were excluded; ⁶TTNT was defined as the time between start of systemic treatment to first dose aC from 3L. The time to next treatment was 8.4 (95%CI, 5.2–11.6) from 1L, and 6.1 (95% CI, 2.7–9.7) months from 2L to 3L.

Conclusions: These poor outcomes underscore the need for the implementation of new treatment options and for specific molecular testing.

P12 | Outcome of critically ill patients with COVID-19 requiring renal replacement therapy

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Background: Kidney involvement within the course of COVID-19 is frequently observed, up to 40% of patients suffer from acute kidney injury. The clinical characteristics, incidence and outcome of critically ill patients requiring renal replacement therapy (RRT) is unclear.

Methods: Retrospective analysis of all COVID-19 patients admitted to the Department of Intensive Care Medicine at the University Medical Centre Hamburg-Eppendorf (Germany) between March, 1st 2020 and July, 31st 2021. Demographics, clinical parameters, type of organ support, length of ICU stay and mortality were assessed.

Results: 308 critically ill patients with COVID-19 were included in the study. The median age was 61 (IQR 51–71) years, 68% (n = 198) were male. On admission, the median SAPS II and SOFA scores were 38.5 (32–46) and 8 (3–12) points, respectively. 42% (n = 125) of patients required non-invasive ventilation and 73% (n = 219) invasive ventilation. Overall, we observed that 68% (n = 204) of patients suffered from ARDS and 30% (n = 90) required ECMO therapy. A total of 139 (46%) critically ill patients required RRT during the ICU stay. Patients with RRT were more often male (71% vs. 61%, p = 0.076), older (62 vs. 60 years, p = 0.015) and presented with higher SAPS II (43 vs. 35 points) and SOFA (11 vs. 5 points) scores on admission (both p < 0.001). Patients with RRT required vasopressor therapy (86% vs. 61%), mechanical ventilation (94% vs. 55%) and ECMO therapy (46% vs. 17%) significantly more often (all p < 0.001). Further, ARDS was more common in patients with RRT (92% vs. 47%, p < 0.001). The median duration of the ICU stay was significantly longer for patients with need for RRT (24 vs. 9 days, p < 0.001). Overall, 61% (n = 85) and 18% (n = 29) with and without RRT died in the ICU (p < 0.001).

Conclusions: About half of critically ill patients with COVID-19 required RRT. The initiation of RRT was significantly associated with severity of illness, complications during the ICU stay and ICU mortality.

P13 | B-Mode imaging in LUS during the pandemic experiences from clinical routine

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Introduction: The ongoing COVID-19 pandemic is a global crisis holding the world hostage and is continuing to present an immense burden on healthcare workers (1). Millions of people have been infected, with numbers still rising, and variants of the virus are still being discovered. With widespread vaccination, this pandemic might come to an end (2, 3). Nevertheless, COVID-19 did boost lung ultrasound (LUS) which will be helpful in daily clinical practice for generations to come.

Methods: In the state hospital of Steyr, many patients are scanned not only using echocardiography, which is a standard in the intermediate & intensive care unit in the department of cardiology, nephrology & intensive care medicine, but also LUS is included in patients with severe & critical diseases such as infections or cardiac diseases. Also, in the echo laboratory, LUS is used complementary to echocardiography based on indications (4–13).

Results: In the case of pulmonary imaging, we recommend a 12-zone scanning protocol in LUS to visualize reverberation artifacts (B-lines or comet tails) to identify, quantify and differentiate the origins of the artifacts as well as for detection of pleural effusion, pneumothorax, and consolidations (13–16).

Conclusions: LUS can be a low-cost, easy-to-use, widely available, and radiation-sparing alternative to serial chest radiographs or CT scans for tracking clinical improvement or identifying complications (13,17,18). CT scans are costly and should be reserved for unclear cases (13,16). Chest radiographs have lower sensitivity than LUS but are widely available, cheap, and standardized (14–16).

Literature at the author.

P14 | Supranormal lung function by age bins in the LEAD Study

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There is a range of lung function trajectories throughout life, both above and below the normal range. The characteristics and associated factors of supranormal trajectories are still poorly understood. Here we explore supranormal lung function in different age bins within the LEAD study, a general population cohort (n=11,423) in Vienna (Austria) ranging from 6–82 years of age (Breyer-Kohansal, R., et al. J Epidemiol 2019). We compared participants with normal (n=9839, FEV1: n=9871, FVC) or supranormal (n=383, FEV1: n=351, FVC) pre-bronchodilator (BD) FEV1 or FVC values (defined as > upper limit of normal – GLI equations). We found that: 1) the prevalence of supranormal pre-BD FEV1 and FVC values was 3.4 % and 3.1 %, respectively, and 5.3 % and 3.2 % after BD. About 50 % of supranormal individuals have both increased FEV1 and FVC values; 2) these figures remained relatively stable over all age bins, except in participants >60 years, in whom they increased to 5.1 % and 4.2 %, respectively; 3) supranormal spirometric values were consistently accompanied by higher static lung volumes and lower specific airway resistance, indicating physiological effects beyond spirometry; and, 4) Univariate analysis and multivariate regression identified female gender, body morphometry (shorter height, higher weight), body composition (lower fat, higher lean body mass), reduced respiratory symptoms, and less diabetes consistently and significantly associated with supranormal lung function. These results describe a proportion of the general population with supranormal FEV1 and/or FVC values through life span that seem to be associated with better health, thus supporting that spirometry is a global health marker (Agusti, A. et al. EJIM 2021).

P15 | Are obesity and visceral adipose tissue a trait of asthma?

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Fat mass, a component of body composition, is a major risk factor and disease modifier for asthma in children and adults. Obesity may reflect vastly divergent physiology and metabolic health, and adipose tissue inflammation is believed to contribute to asthma morbidity. Body mass index (BMI) and body composition including visceral adipose tissue (dual-energy X-ray absorptiometry) were assessed in current asthmatics versus the general population (GP) within the LEAD study, a single-centred, observational, population-based cohort study including 11,423 participants aged 6–82 years (y) from Austria. 492 participants had a doctor’s diagnosed current asthma. The prevalence of obesity (BMI > 30 kg/m² or ≥2 SD in under 19 y) was 21.1 % (vs 16.0 % in GP, p=0.002). BMI was higher in asthmatics vs GP (26.2 ± 5.4 vs. 25.1 ± 5.2; p<0.001), both in in the youngest (<20 y; 21.4 ± 4.0 vs 19.5 ± 4.0; p<0.001) and middle-aged (20–60 y; 26.3 ± 5.2 vs 25.3 ± 4.7; p<0.001). These findings were reflected in fat mass index (<20 y; 6.7 ± 2.9 vs 5.7 ± 2.6; 20–60 y: 9.2 ± 4.0 vs 8.3 ± 3.4 kg/m²). Conversely, while elderly asthmatics (60+ y) did not show increased BMI vs GP, visceral adipose tissue (VAT) mass (1661.3 ± 957.7 vs 1490.6 ± 888.1 g), volume (1776.7 ± 1015.1 vs 1570.1 ± 921.7 mL), and z-scores were higher. Obesity is more prevalent in current asthmatics than in the GP. Our data illustrate that asthma has major association with body composition, already present in children which may reflect a worse long-term prognosis if not reverted. In the elderly, VAT seems to be a more reliable parameter for body composition. We therefore suggest an integrated, age-dependent assessment of pathophysiologic changes related to body composition in asthma.

P16 | Diagnostic work-up of asthma: more than spirometry

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Asthma is characterised by a pattern of respiratory symptoms and variable expiratory flow limitation. Lung volumetric measures such as residual volume (RV) and total lung capacity (TLC) have been shown to be potential measures in evaluating asthma. Combined assessment of spirometry and body plethysmography in population-based cohorts are scarce. We report lung volume changes in clinically diagnosed asthmatics participating in the LEAD study, a single-centred, observational, longitudinal, population-based study of 11,423 subjects, aged 6–82 years (y), from Vienna and lower Austria. Lung function measurements included pre- and post-bronchodilation (BD) spirometry and body plethysmography according to international guidelines. 492 participants (45.3 % male) were identified as current asthmatics. The FEV1/FVC ratio was significantly lower in asthmatics versus the general population (72.6 % vs 79.9 %; p<0.001). TLC was not different between asthmatics and GP (GLI; 106.7 % vs. 106.1 %). The RV/TLC ratio was significantly higher in asthmatics (37.4 % vs 28.5 %; p<0.001) and in age groups (20–60 and >60y) except in young (<20y) asthmatics (28.5 % vs 26.4 %). RV/TLC % was particularly increased in asthmatics >60y (47 % vs 42.3 % p<0.001). Specific airway resistance...
was significantly higher in asthmatics (1.3 vs 0.9 kPa/s; \( p < 0.001 \)) and a difference was present in all age groups. Furthermore, a correlation was found in asthmatics between airway resistance and RV/TLC % both pre- (\( R = 0.585, \ p < 0.001 \)) and post-BD (\( R = 0.576, \ p < 0.001 \)). In conclusion, lung volumes are a reliable complement of spirometry in older asthmatics. Furthermore, asthmatics above the age of 20y manifest a progressive increase in RV/TLC and airway resistance that may be related to airway remodeling.

P17 | Lung volume reduction using Bronchoscopic Thermal Vapor Ablation (BTVA): 24 months results from a prospective registry

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Introduction: Targeted BTVA in patients with severe emphysema causes local inflammation with subsequent volume reduction. Preliminary data suggest lung function and quality of life improvements. However, long term follow-up data is lacking.

This study looks at the longer-term effects of BTVA with regard to lung function, exercise capacity, and quality of life.

Methods: Data from patients treated at two clinical sites within an ongoing registry were analyzed. Measurements included FEV1 (Forced Expiratory Volume in 1 sec.), RV (Residual Volume), 6MWT (6-minute walking test) and SGRQ-C (St. George's Respiratory Questionnaire) prior to treatment and up to 24 months after.

Results: Data (mean ± standard deviation) on 69 patients with emphysematous phenotype of COPD (age 64.3 ± 7.4 yrs; BMI 23.4 ± 4.1 kg/m²) from June 2018 to March 2022 were included. Overall 107 procedures were performed that treated 131.5 segments.

A total of 39 treatment related serious adverse events (11 were definitely related and 28 possibly related) were reported during 2 years of follow-up. 20 of the 39 serious adverse events were classified as severe (4 as mild, 15 as moderate). 16 of those 20 severe cases resolved without sequelae. After 12 months, FEV1 (baseline 0.77 ± 0.22 L) increased by 13.0 ± 25.9 % (\( p = 0.0048 \)), RV (baseline 5.34 ± 1.24 L) was reduced by 4.9 ± 15.3 % (\( p = 0.0634 \)), 6MWT (baseline 283 ± 1.89.5) increased by 31.1 ± 94.1 m (\( p = 0.0753 \)) and SGRQ-C (baseline 66.0 ± 13.4) improved by -6.8 ± 19.1 units (\( p = 0.0466 \)). After 24 months, there were no clinically or statistically significant changes from baseline.

Conclusions: This is the first longer term follow up report of patients being treated with BTVA in clinical practice. The data show consistent improvements in FEV1, RV, 6MWT and quality of life throughout 12 months, however, suggest waning treatment effects after 24 months.

P18 | Non-invasive ventilation during exercise training in people with COPD and chronic hypercapnic respiratory failure – a randomized controlled trial

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Introduction: COPD patients with chronic hypercapnic respiratory failure (CHRF) may have difficulty performing a standardized exercise training program as part of pulmonary rehabilitation (PR). Personalized exercise training programs can include the use of non-invasive ventilation (NIV), but the benefit in exercise outcomes or breathlessness from training with NIV and its acceptance in these physically limited patients is still unclear.

Objective: To examine the effect of exercise training with high pressure NIV compared to training without on exercise capacity and the subjective preference of participants to the use of NIV during exercise.

Methods: COPD patients with nocturnal NIV due to CHRF were randomized to a 3-week inpatient PR including supervised cycle training with NIV (intervention-group; IG) or without NIV (control-group, CG): Clinical trial registration—NCT03803358.

Primary outcome was change in cycle endurance time (CET). Secondary outcomes were dyspnoea at isotime in the CET and during training sessions (e.g. daily Borg scale) and post-trial preferred training method.

Results: 26 patients (59 ± 13 y, FEV1 22 ± 7%pred, PCO2 52 ± 8 mmHg, training sessions, \( n = 12 ± 2 \)) completed the trial (IG: \( n = 13 \) training NIV-pressures during training: IPAP \( 26 ± 3/EPAP \ 6 ± 1 \) cmH2O; CG \( n = 13 \)). At PR end, within-group CET-changes were significant (all \( p < 0.05 \)). No significant between-group differences in CET change were seen (CG-IG \( 4 ± 105 ± 95\%CI [-301 to 91], p > 0.05 \)). Compared to CG, IG felt less dyspnoea at isotime during the final CET (median 4 IQR [4,5] vs. 6 [5,7] pts, \( p = 0.006 \)) and during training sessions (\( p < 0.05 \)). Most of the IG (\( n = 12 \)) preferred training with NIV to without.

Conclusions: Exercise capacity improved in both groups with mean CET difference greater than the minimally clinically important difference with no statistically greater benefit from training with NIV—however, dyspnoea was improved with NIV and most participants preferred training with NIV to without.
P19 | Reference values for respiratory impedance in adult men and women: data from the Austrian LEAD Study

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**Background:** Determination of reference values for respiratory impedance (Zrs) measured by forced oscillation technique (FOT) is of utmost importance in its clinical use. The aim of our study was to present reference values for whole-breath FOT measurements for adults (18–80 years).

**Methods:** 1264 adult healthy asymptomatic never-smokers of the Austrian LEAD Study cohort were included in the analysis. Nearly all participants had normal weight (BMI ≤ 35) and had normal lung volumes (total lung capacity (TLC) ≥ lower limit of normal). Data were collected with the Resmon Pro FULL device using a multiple frequency mode of 5–11.19 Hz. Sex-specific prediction equations were developed for Resistance (R) 5 Hz (expiratory (exp.), R8 inspiratory (insp.), R5 total (tot.), Reactance (X) 5 exp., X5 insp. and X5 tot. using the LMS (lambda, mu, sigma) method.

**Results:** We created percentile curves and look up tables including reference values for a height from 143 cm to 204 cm. While R values in men decrease with height between 150 cm and 180 cm and flattened at higher length (> 180 cm), R values in females progressively declined with higher height. X showed a progressive increase with height in men and a flattening of X at higher length (> 180 cm) in women.

**Conclusions:** Our study provides highly accurate reference values for clinically useful Zrs parameters in the form of look up tables. Beside the establishment of reference values further research is required for the optimal positioning of Zrs in respiratory diagnostics.

P20 | Respiratory impedance reference values in children and adolescents: the Austrian LEAD Study

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**Background:** The forced oscillation technique (FOT) is ideally suited to diagnose and manage respiratory diseases and requires only minimal patient cooperation. The present study aimed to create sex-specific reference equations for children and adolescents aged 6 to 17 years.

**Methods:** 981 healthy participants aged 6 to 17 years of the Austrian LEAD general population cohort were included. Nearly all participants had normal weight (BMI ≤ 99th percentile) and all had normal lung volumes (total lung capacity (TLC) ≥ lower limit of normal). FOT data were collected with the Resmon Pro FULL device using a single frequency mode of 8 Hz. Sex-specific prediction equations were developed for Resistance (R) 8 Hz (expiratory (exp.), R8 inspiratory (insp.), R8 total (tot.), Reactance (X) 8 exp., X8 insp. and X8 tot. using the LMS (lambda, mu, sigma) method. Since body height showed the most significant influence on the parameters chosen, we used it as a single covariate.

**Results:** We created percentile curves and look up tables including reference values for a height from 101 to 183 cm. Male and female children showed a progressive decline in R values over the height spectrum studied. Similarly, X values progressively increases with higher height. R values are higher in females than in males.

**Conclusions:** Our study provides highly accurate reference values for clinically useful respiratory impedance (Zrs) parameters in the form of look up tables. To the best of our knowledge, our cohort is the largest population in the age of 6 to 17 years studied so far concerning Zrs. Further studies have to link these height related geometric changes of the airway tree to related changes in lung size.

P21 | Detection of structural pulmonary changes with real-time high-fidelity analysis of expiratory CO2

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**Introduction:** Diffusion capacity for carbon monoxide (DLCO) is an established sensitive marker of early structural lung changes. As for its determination, foreign gas is necessary, we aimed to investigate, if high-fidelity expiratory CO2-analysis provides diagnostic information about structural changes in chronic lung diseases without use of foreign gas.

**Methods:** Patients with chronic obstructive pulmonary disease (COPD), interstitial lung disease (ILD), pulmonary arterial hypertension (PAH) and healthy controls, who underwent clinical work-up and CO2 analysis by Easy One Pro Device (ndd, Zürich, Switzerland) were enrolled prospectively. A dedicated software allowed to generate fully-automatic analysis of CO2 curves with distinction of dead-, mixed- and alveolar space vol-

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**Abstracts**

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**P19** Reference values for respiratory impedance in adult men and women: data from the Austrian LEAD Study

**P20** Respiratory impedance reference values in children and adolescents: the Austrian LEAD Study

**P21** Detection of structural pulmonary changes with real-time high-fidelity analysis of expiratory CO2
Abstracts

P22 | Effects of an automatically titrating oxygen-flow system during walking in hypoxemic post SARS-CoV-2 patients – a pilot randomized controlled double-blind cross over trial

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Background: Patients after SARS-CoV-2 infection without pre-COVID-19 oxygen requirements, 35% needed oxygen after hospital discharge (1.). There is evidence an automatically titrating O2 system (ATOS), titrating to a predefined SpO2-target, can be superior than constant flow system (CFOS) during walking in people with COPD and hypoxaemia (2.). The primary aim of this study is to investigate the effects of ATOS compared to CFOS on walking capacity in people after SARS-CoV-2 infection.

Methods: Fifteen participants who recovered from COVID-19 but with ongoing hypoxemia completed this pilot randomized-controlled double-blind cross-over trial. Each participant performed, with a 24 h-break, two Endurance Shuttle Walk Tests (ESWT) at 85% of maximum pace with: (1) individually prescribed CFOS (ESWT-CFOS) and (2) ATOS (SpO2-target = 92%) (ESWTATOS). The primary outcome was isotime (end of shortest ESWT) SpO2. Walking endurance time and isotime transcutaneous-PCO2 (TcPCO2), respiratory-rate [RR] and heart rate [HR] were also compared. Pre and post ESWT dyspnoea was rated via Borg-scale.

Results: Participants (62.8 ± 8 years, FEV1: 89 ± 14%pred., PO2: 62 ± 13 mmHg) had a significantly higher SpO2 at isotime (91.2 ± 2% vs. 87.6 ± 8%, p < 0.05) during ESWTATOS compared to ESWT-CFOS. Measures of TcPCO2isotime, RRisotime and HRisotime were comparable between tests (p > 0.05). Participants walked a further to a clinically relevant amount in ESWTATOS compared to ESWT-CFOS (635 ± 533 s vs. 470 ± 402 s, p > 0.05). Although not statistically significant, people tended to have lower dyspnoea (median [IQR] 4 [2–6] pts. vs. 5 [4–6] pts.) with ATOS compared to CFOS. Average ATOS flow was 5.8 ± 4.6 L/min vs. 3.6 ± 1.5 L/min for CFOS.

Conclusions: In hypoxemic patients after SARS-CoV-2 infection the use of automated O2-flows leads to a significantly and clinically relevant improvement in SpO2 during walking exercise. Participants tended to feel less dyspnoea even with longer walking times. ATOS may be useful for patient tailored therapy in hypoxemic post-COVID-19-patients, particularly to ensure appropriate oxygenation and minimize dyspnoea during exercise.

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P23 | TriMaximize: A multicentre prospective non-interventional study monitoring therapy pathways of asthmatics treated with an extralfine fixed dose ICS/LABA/LAMA therapy in real-world practice

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Introduction: The goals of asthma therapy for all stages of disease severity are achieving good symptom control and preventing asthma exacerbations. Despite the existing treatment options and elaborate guidelines, 35% to 45% of the GINA Step 4 and 5 patients suffer from inadequately controlled symptoms. To understand the cause of insufficient treatment results it is essential to monitor therapy pathways of asthma patients in a real-world setting.

Methods: TriMaximize is a multinational, multicentre, prospective, non-interventional study monitoring therapy pathways of asthmatics treated with a single-inhaler triple ICS/LABA/LAMA therapy consisting of extrafine beclometasone dipropionate, formoterol fumarate and glycopyrronium (BDP/FF/G) in real-world practice. It is planned to enroll up to 3,950 patients all over Europe. The primary objective is to describe patient characteristics and therapy pathways, secondary objectives include the assessment of asthma control, quality of life, treatment adherence, treatment persistence, use of rescue medication, use of systemic corticosteroids, healthcare resource utilization and incidence and severity of asthma exacerbations as well as changes in key spirometry parameters.

Results: First analysis of Austrian data will be presented.

Conclusions: TriMaximize study is expected to give relevant information about the real-life effectiveness of extralfine BDP/FF/G in patients with asthma.
P24 COPD and unvaccinated against COVID-19 – real world data from the Austrian CLARA II project in COPD outpatients

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Background: Vaccination against SARS-CoV-2 is an effective preventive measure in risk groups, such as COPD patients. Little is known about clinical differences between COPD patients that have chosen to be vaccinated against COVID-19 versus those who did not.

Methods: We conducted a national, cross-sectional study in offices of 89 pulmonologists in Austria, to determine clinical characteristics, symptom profile, and COVID-19 vaccination data in patients with stable COPD: data collection was performed between 09/2021 and 01/2022. A demographic questionnaire, the St. George’s Respiratory Questionnaire for COPD patients (SGRQ-C), and the 9-question Patient Health Questionnaire (PHQ-9) were used to assess for disease specific symptoms and symptoms of depression. Inclusion criteria were a physician’s diagnosis of COPD and age ≥ 40 years. Subjects with a history of major lung surgery, lung cancer, or COPD exacerbation within the last four weeks were excluded.

Results: Of 841 COPD patients included, 183 did not fulfill the GOLD criteria for COPD (FEV1/FVC ≥ 0.7) and 28 were excluded due to missing data. Finally, 630 patients (62.5% men; mean age 66.8 ± 0.3 (SE) years; mean FEV1%pred. 56.5 ± 0.7 (SE)) were analyzed. 47% had at least one exacerbation in the previous year, mean SGRQ-C was 38.2 ± 0.9 (SE), mean PHQ-9 score was 5.4 ± 0.9 (SE).

33 patients (5.2 %) were not vaccinated against COVID-19. Unvaccinated patients tended to be younger (mean age 65.6 vs. 66.8 years), more likely of male sex and had a numerically higher mean PHQ-9 score (mean total score 7.1 vs. 5.3). No difference was seen in the SGRQ-C scores. Multivariate regression analysis revealed that unvaccinated patients had statistically significant higher total PHQ-9 scores (OR 1.08 (1.1-1.2 CI, p = 0.029) compared to vaccinated patients.

Conclusions: In a representative sample of stable COPD patients, unvaccinated patients appear to suffer more likely from symptoms of depression than vaccinated individuals.

P25 Recovery trajectories 12 months after COVID-19 – an observational prospective multicenter trial

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Background: Trajectories of recovery from COVID-19 call for longitudinal investigation. We aimed to characterize the kinetics and status of clinical, cardiopulmonary and mental health recovery up to 1 year after COVID-19.

Methods: Clinical evaluation, lung function testing (LFT), chest computed tomography (CT) and transthoracic echocardiography (TTE) were conducted at 2-, 3-, 6- and 12-months after disease onset. Submaximal exercise capacity, mental health status and quality of life (QoL) were assessed at 1 year. Recovery kinetics and patterns were investigated by mixed-effect logistic correlation and clustering analyses. Logistic regression was used to model risk of persistent symptoms and cardiopulmonary abnormalities at the 1-year follow-up.

Results: Out of 145 CovILD study participants, 108 (74.5%) completed the 1-year follow-up (median age: 56.5 years, 59.3% male; 24% ICU patients). Key outcome measures plateaued after 180 days. At 12 months, persistent symptoms were found in 65%, 33% suffered from LFT impairment, 51% showed CT abnormalities, and 63% had low-grade diastolic dysfunction. Number of persistent symptoms, predominately self-reported fatigue and dyspnea, but not cardiopulmonary findings correlated with diminished QoL and poor mental health. Inflammatory biomarkers (interleukin 6, C-reactive protein, D-dimer) and anti-SARS-CoV-2-IgG antibody levels at early follow-up visits were identified as risk factors for persistent cardiopulmonary findings.

Conclusions: One year after COVID-19, three recovery trajectories are emerging, separating almost complete recovery from patients with a post-acute inflammatory profile and cardiopulmonary residuals from a female-dominated post-COVID syndrome with reduced mental health status. These observations set the stage for further mechanistic and therapeutic considerations.
P26 | Clinical, Imaging and Blood Biomarkers to Predict Progression in Fibrotic Interstitial Lung Diseases

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Introduction: Progression of fibrotic interstitial lung disease (FILD) leads to irreversible loss of lung function and increased mortality. Based on an institutional ILD registry, we aimed to evaluate biomarkers derived from baseline patient characteristics, computed tomography (CT) and peripheral blood (PB) for predicting disease progression in FILD patients.

Methods: Of 209 subsequent ILD-board patients enrolled, 142 had complete follow-up information and were classified FILD as defined by presence of reticulation or honeycomb using a standardized semi-quantitative CT evaluation, adding up typical ILD findings in 0 to 6 defined lung fields. Progression at one year was defined as ≥10% loss in forced vital capacity, ≥15% in diffusion capacity for carbon monoxide, death, or lung transplant. Two thirds of the patients were randomly assigned to a derivation cohort evaluated for the impact of age, sex, baseline lung function, CT finding scores and PB biomarkers on disease progression. Significant variables were included into a logistic regression model, its results were used to derive a progression risk score.

Results: In the derivation cohort, baseline patient characteristics did not affect PFS, while honeycombig (p = 0.01) and traction bronchiectasis (p = 0.04) extent in CT had significant impact. Among PB biomarkers, absolute monocyte count ≥0.65 G/L was shown significant (p = 0.01; 1 point). This was combined with a joint honeycombing and traction bronchiectasis score (0 vs. 1-4 (1 point) vs. 5-6 (2 points); p = 0.05). In the validation cohort, resulting scores of 0, 1, 2 and 3 accounted for progression rates of 0%, 28.6%, 46.2% and 62.5%, respectively. A score >1 had 64.7% sensitivity and 64.3% specificity for progression at one year, receiver operating characteristic analysis for the score model had an area under the curve of 64.7%.

Conclusions: The extent of honeycombing and traction bronchiectasis, as well as elevated blood monocyte count predicted of one-year PFS in FILD patients.

P27 | The clinical, non-invasive H2FPEF score is a predictor of elevated PAWP during exercise

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Background: Heart failure with preserved ejection fraction (HFpEF) is often associated with a pulmonary arterial wedge pressure (PAWP) which is >15 mmHg at rest or >25 mmHg during exercise. The H2FPEF score, based on clinical data and echocardiography, has been established for the prediction of PAWP >15 mmHg at rest. Recent data suggest that exercise may uncover early left heart failure, which is not apparent at rest. We aimed to assess the diagnostic value of the H2FPEF score to predict an elevated PAWP during exercise and its association with survival, exercise capacity and dyspnea.

Methods: We retrospectively analysed all patients with resting mPAP <25 mmHg and at least one year follow-up who underwent symptom-limited exercise right heart catheterization between 2008 and December 2021 in our PH clinic. We performed Receiver-Operating-Curve analysis, Pearson correlations and Cox regression analysis for all-cause mortality, peak VO2, and Borg Dyspnea Index (BDI).

Results: We included n = 177 patients (n = 109 female, median age 66 (IQR 55–74) years, mPAP 19 (IQR 16–22) mmHg, PAWP 6 (IQR 6–11) mmHg). The H2FPEF score predicted an elevated PAWP during rest and exercise with an AUC of 0.694 (95% CI 0.322–0.978, p = 0.309) and 0.694 (95% CI 0.575–0.814, p = 0.003), respectively, and was significantly correlated with peakVO2 (p = 0.023, coeff = -0.222), 6-minute-walk-test (p < 0.001, r = -0.426), BDI (p = 0.001, r = 0.269) and NT-proBNP (p < 0.001, r = 0.495). The H2FPEF score, and peak PAWP >25 mmHg were not associated with mortality (AUC 0.569 (95% CI 0.439–0.699, n = 320), and (n = 320, HR: 0.88 (0.32–2.43), respectively. In contrast, peak CO (p = 0.041, HR: 0.88 (95% CI 0.78–0.99), TPG/CO slope (p = 0.010, HR: 1.16 (1.04–1.29)), PAWP/CO slope >2 WU (p = 0.013, HR: 4.07 (1.35–12.32)) and mPAP/CO slope >3 WU (p = 0.030, HR:3.99 (1.14–13.95)) were significantly associated with mortality.

Conclusions: In patients with dyspnea on effort the H2FPEF score is a predictor of elevated PAWP during exercise and is correlated with many markers of exercise capacity but not with all-cause mortality, while exercise pulmonary hemodynamics are significantly associated with all-cause mortality.

P28 | COPD treatment adjustments and corresponding reasons in pharmacologic maintenance therapy in an outpatient setting

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Introduction: Guidelines recommend regular review and adjustment of pharmacological COPD therapy. This study describes the types and reasons for COPD maintenance therapy adjustments in Austrian COPD outpatients.

Methods: 1137 COPD patients by 75 office-based pulmonologists were included in the cross-sectional STEP study in Austria in two phases (July—September 2021 and January—April 2022). Patients (n = 1137, 57% males, mean age 67 y) had COPD grade I, II, III, IV airflow obstruction in 105 (9%), 615 (54%), 336 (30%), 78 (7%) cases, respectively. Prevalence of COPD stages A, B, C, D was 184 (16%), 746 (67%), 13 (1%), 178 (16%), respectively.

Results: Initial LAMA/LABA treatment, [LAMA/ICS or LABA/ICS], and triple therapy were used in 413 (36%), 183 (16%), and 343 (30%) patients, respectively. 673 patients (59%) had a therapy step-up (addition of substance class and/or dose escalation), 215 (19%) had a step-down, and 246 (22%) had a switch within the same therapeutic class (Fig. 1). Reasons for step-up from LAMA/LABA to triple therapy were ongoing...
Abstract P28 | Fig. 1  a = and; o = or; left = current therapy; right = therapy after adjustment

symptoms, limitations of daily activities, and exacerbations; reasons for step-down from triple therapy to LAMA/LABA were stable/improved lung function, no/seldom exacerbations and hardly any symptoms.

Conclusion: Most patients had a therapeutic step-up. Ongoing symptoms were the most frequent reason for step-up to triple therapy.

P29 | Mesalazine-induced hypersensitivity pneumonitis

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A 52-year-old patient presented with cough and dyspnea. The patient suffered from Crohn’s disease for which he received Mesalazine.

The CT-scan showed bilateral micronodular changes. Lung function tests showed a restrictive pattern as well as significantly reduced DLCO.

The histopathologic and cytological samples gained via bronchoscopy showed a pattern of organizing pneumonitis compatible with drug-induced alterations. An infectious cause of the disease was excluded, as was exogenous allergic alveolitis.

As therapy with Mesalazine was terminated respiratory symptoms resolved quickly. After two weeks lung function test showed only mild obstruction. DLCO improved and radiographic changes resolved without further measures.

P30 | Combined analysis of five non-interventional studies on effectiveness, tolerability, and safety of the extrafine fixed dose beclometasone/formoterol combination in the treatment of asthma in Austria

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Introduction: The real-world effectiveness and tolerability of an extrafine fixed dose beclometasone/formoterol (BDP/FF) treatment of patients with partially or non-controlled asthma was evaluated in five non-interventional studies (NISs) from Austria.

Methods: Asthma patients enrolled in these five NISs were treated with beclometasone/formoterol (Foster® or Foster® Nexthaler®) maintenance and reliever therapy over 12 weeks. Asthma control, lung function and symptom scores were assessed at baseline, after 4–8 weeks and at the end of the investigations in week 12. In addition, tolerability and handling of the devices were evaluated by questionnaires.

Results: The combined analysis included 891 patients (53% female, aged 49.3 years) demonstrating significant improvements in asthma control, lung function (PEF, FEV1 and FVC) and symptom scores (reduction of breathlessness, wheezing, chest tightness and cough). These changes were already detectable after 4–8 weeks. The treatment was effective irrespective of smoking status, exercise, or previous medication. Tolerability of the therapy with extrafine BDP/FF was rated as “very good” and “good” in 98% of the patients. 95% of the patients intended to continue the treatment, and nearly all (99%) rated the handling of the device as “very good” or “good”. No serious adverse reactions were reported.

Conclusions: This combined analysis of five non-interventional studies confirms the effectiveness and tolerability of the extrafine fixed-dose BDP/FF combination (Foster® and Foster® Nexthaler®) in a heterogeneous patient population suffering from partially or non-controlled asthma. Therapy was associated with a high patient satisfaction and the absence of serious adverse reactions.

P31 | Role of wearables in diagnostics and treatment of patients with pulmonary diseases

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Introduction: Wearables play an increasing role in lifestyle control and medicine. They are used for control of activity, fitness and pulse rate (e. g. in sports), but also diagnostics/control of heart rate/arrhythmia, blood pressure, blood oxygenation, sleep apnea and lung function. Most devices are available for lay people and are not CE certified (Europe) or approved/cleared (USA) medical devices. Results of different devices can be easily combined and processed by algorithms/artificial intelligence and are used by physicians for diagnostics and monitoring of patients.

Methods: Study aim was an overview of wearables for use in cardiopulmonary medicine and rehabilitation including underlying technologies, indications for use and regulatory status.

Results: Wearables allow short time or continuous monitoring of various cardiopulmonary parameters. Underlying technologies differ in respect to technology and biomarkers (e. g. triaxial accelerometers (activity control), electrocardiogram/photoplethysmography (heart rate/arrhythmia), impedance (thoracic fluid), spectroscopy (pulse oximetry), flow measurement (sleep apnea, asthma), sound recording (digital stetho-
Abstracts

P33 | Gender Differences regarding Metabolic Syndrome in Patients with Chronic Obstructive Lung Disease

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Introduction: The Metabolic Syndrome is a common comorbidity in patients with chronic obstructive pulmonary disease. This can be explained with same risk factors for both pathologies as well as physical inactivity and chronic inflammation due to COPD. Until now, it’s not known if there are any gender differences regarding the prevalence of metabolic syndrome in patients with COPD.

Methods: We have analysed data from our prospective patient’s registry for patients with COPD dated from 2020 until now. We extracted the following parameters: gender, lung function (forced expiratory volume in 1 sec, FEV1), Body Mass Index (BMI), Prevalence of Arterial Hypertension, Diabetes mellitus and Hyperlipidemia.

Results: The data of 54 patients (52% males) with COPD were analysed until now. The males had an average FEV1 of 1.69L (52.6%) and the females had an average FEV1 of 1.25 L (55%). The most common manifestations of metabolic syndrome were arterial hypertension with 71%, then Diabetes mellitus and Obesity with 25%, respectively. The male patients had more often Obesity (8/24), arterial hypertension (21/25) and Diabetes mellitus (9/28).

Conclusions: The manifestations of the metabolic syndrome are common comorbidities in patients with COPD. It is possible that there are gender differences in the prevalence of the metabolic syndrome in this population, but further analyses are needed to elucidate this question.

P32 | Biomarkers of endothelial (dys)function and their association with smoking, smoking cessation and mortality in the Ludwigshafen Risk and Cardiovascular Health (LURIC)

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Background: Smoking is risk factor for the development of endothelial dysfunction. The endothelial dysfunction precedes atherosclerosis. Aim of our study was to analyse the effect of smoking on circulating markers of endothelial function and to investigate whether such effects have an influence on the potential use of these markers to estimate cardiovascular risk.

Methods: Levels of sE-/sP-/sL-selectin, von Willebrand (vWF), sICAM-1 and sVCAM-1, their association with mortality using Cox regression (stratified for smoking) and their accuracy of risk prediction using area-under-the ROC-curve and net-reclassification-index were analysed in 1926 participants from the Ludwigshafen Risk and Cardiovascular Health (LURIC)—a prospective case-control study in patients who underwent coronary angiography with a median mortality follow-up of 10.6 years.

Results: We found, higher concentrations of sICAM-1, sE-selectin and sP-selectin in smokers, whereas the concentrations of sL-selectin and sVCAM-1 were decreased as compared to never-smokers. A direct association with mortality was found for levels of sICAM-1, sVCAM-1 and vWF regardless of smoking status. Low sL-selectin levels were inversely associated with mortality in heavy and light smokers, with hazard ratios of 0.72 and 0.67 per 1-SD increase, adjusted for cardiovascular risk factors. Adding sL-selectin to a model based on traditional risk factors significantly improved the AUC from 0.725 to 0.752 ($p=0.034$) with an NRI of 43% (16.9%–62.3%).

Conclusions: Smoking alters the concentration of circulating markers of endothelial function. sL-selectin is decreased in smokers, inversely associated with risk, and could be a useful marker to improve risk prediction.
P34 | Towards clinical remission in severe asthma: An analysis of patients treated with benralizumab in the phase 3b ANDHI trial

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Background: A consensus definition for clinical remission (CR) in severe asthma (SA) was recently published. The ANDHI trial assessed the efficacy of benralizumab, an afucosylated monoclonal antibody directed against the interleukin-5 receptor α. This analysis applied a composite remission definition to characterize patient responses after 6 months of treatment with benralizumab.

Methods: ANDHI was a phase 3b randomized, double-blind, multicenter trial in patients with uncontrolled, severe eosinophilic asthma, and an Asthma Control Questionnaire 6 (ACQ-6) score ≥1.5. For this analysis, patients receiving long-term OCS at the baseline visit were excluded. Components of CR for this study were: zero exacerbations; zero OCS; ACQ-6 <1.5 or ≤0.75; and pre-bronchodilator forced expiratory volume in 1 sec (FEV1) increase ≥100 mL. CR was defined as achieving all 4 components with an ACQ-6 ≥0.75 after 6 months of treatment. In ANDHI, 6 months was defined as Week 24 or the last recorded datapoint, which could have occurred after the Week 24 visit (labelled as Week 24); for patients with missing values for FEV1 or ACQ-6, available measurements within ±4 weeks of the labelled Week 24 were used.

Results: Overall, 331 patients receiving benralizumab were included in this analysis; 71.3% had zero exacerbations, 93.7% had zero OCS, 48.9% and 26.9% had ACQ-6 scores <1.5 and ≤0.75, respectively, and 56.2% had pre-bronchodilator FEV1 increases ≥100mL. In total, 81.3% of patients achieved ≥2 components with an ACQ-6 ≥0.75 after 6 months of treatment. After 6 months of treatment with benralizumab, 16.6% achieved CR, whereas 28.7% achieved all 4 remission components when the less stringent ACQ-6 threshold of <1.5 was used.

Conclusions: This analysis, using a novel definition of remission, suggests that CR may be achieved in SA through precision medicines that treat to target the underlying drivers of inflammation; further analyses out to 12-18 months are currently underway.

P35 | Right ventricular-pulmonary arterial (RV-PA) coupling as a predictor for pulmonary vascular disease due to chronic thromboembolism

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Introduction: Chronic thromboembolic pulmonary disease (CTED) and chronic thromboembolic pulmonary hypertension (CTEPEH) represent a continuum of pulmonary vascular disease (PVD). We aimed to assess the association of RV-PA-coupling with clinical characteristics, including resting- and exercise hemodynamics. We hypothesized that assessment of RV-PA-coupling may help to identify PVD and pathological pulmonary exercise hemodynamics.

Methods: Patients with CTEP, CTEPH and patient-controls (without relevant cardiopulmonary comorbidities + normal resting haemodynamics) undergoing resting-, exercise-RHC and echocardiography were analysed. Exercise-PH was defined as mPAP >30 mmHg and total pulmonary resistance>3WU at peak exercise. TAPSE/SPAP ratio was used as surrogate for RV-PA-coupling. Patients were grouped into tertiles according to their TAPSE/SPAP ratio (preserved coupling: >0.76 mm·mmHg–1; impaired coupling: 0.76–0.51 mm·mmHg–1; exhausted coupling: ≤0.51 mm·mmHg–1).

Results: N = 53 patients with CTED (n = 33) or CTEPH (n = 20) and 19 patient-controls were included (age: 54 ± 14 yrs; female: 58%). Peak oxygen consumption (peakVO2) and Cardiac-Output (CO) significantly declined from the preserved to the exhausted coupling group (peakVO2: 17.9 (16.7–22.0) mL·min–1·kg–1, 15.1 (11.7–17.2) mL·min–1·kg–1 and 13.2 (11.0–17.1) mL·min–1·kg–1, respectively (p < 0.001); CO: 5.4 ± 0.3L·min–1, 4.6 ± 0.2L·min–1 and 4.6 ± 0.2L·min–1, respectively (p = 0.033)). In contrast, NTproBNP, mPAP and PVR significantly increased across the three TAPSE/SPAP-tertiles (NT-proBNP: 68 (43–118) pg·mL–1, 99 (38–214) pg·mL–1 and 545 (155–1923) pg·mL–1, respectively (p < 0.001); mPAP: 16 (14–17) mmHg, 20 (18–22) mmHg and 39 (32–48) mmHg, respectively (p < 0.001); PVR: 1.3 (1.1–1.7) WU, 1.9 (1.2–2.5) WU and 6.8 (4.2–8.5) WU, respectively (p < 0.001)). MPAP/CO-slope was significantly correlated with TAPSE/SPAP-ratio (r = −0.806; p < 0.001). Receiver-operating-characteristic analysis identified a TAPSE/SPAP cut-off of 0.80 mm·mmHg–1 for predicting PVD (CTED or CTEPH; AUC: 0.896; sensitivity: 89%; specificity: 79%). Furthermore, a TAPSE/SPAP cut-off of 0.76 mm·mmHg–1 predicted Exercise-PH (AUC: 0.912; sensitivity: 89%; specificity: 74%).
Conclusions: To the best of our knowledge, this is the first report showing that a simple surrogate of RV-PA coupling may help to characterize and identify patients with PVD due to chronic thromboembolism and predict impaired pulmonary exercise haemodynamics in these patients.

P36 | Global prevalence and associated risk factors of chronic cough

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Background: Global data about chronic cough are limited and derive mainly from studies not analyzing chronic cough as the primary outcome. Further, the applied definitions of chronic cough have been heterogenous making estimated global prevalence rates difficult to compare and in general more prone to being biased. We are missing representative data with homogenous assessment that allow us to understand global demographics and characteristics of chronic cough. Aim of the study was to determine global prevalence and to investigate risk factors.

Methods: Our study comprised 34.092 participants from BOLD, a multinational study including representative population-based samples of adults aged ≥ 40 years across 34 countries. Chronic cough was defined as cough on most days for at least 3 months in two consecutive years.

Results: Global prevalence of chronic cough among all sites was 8.9%. Highest rate of chronic cough prevalence was reported 19.6% in Lexington (USA) compared to the lowest prevalence rate being 0.6% in Ile (Nigeria). While 27.4% had a cough duration less than two years and a comparable proportion (29%) for 2 to 5 years, 43.6% were suffering from chronic cough for over 5 years. The highest prevalence of the latter group was found in Bergen (Norway) with almost 70% of all chronic cough individuals. In Salzburg (Austria), chronic cough prevalence was 6% of whom 59.3% had a cough duration over 5 years. First multivariable analysis models adjusted for airflow limitation showed chronic cough associations with older age, female sex, less education, former smoking, and self-reported history of tuberculosis.

Conclusions: Prevalence data of chronic cough vary widely across the studied sites. Beside the reported risk factors, further sub-analyses are needed to determine regional differences and to expand our global knowledge about chronic cough as a multifactorial clinical entity.

P37 | Is chronic cough an additional marker for lung function decline?

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Background: Recent studies show that the CT measured total airway count (TAC) is reduced in COPD and is associated with FEV1 decline over time. In addition to TAC, we aimed to investigate whether chronic cough is an independent determinant of FEV1 decline.

Methods: From CanCOLD, a Canadian multi-center, population-based study, 1183 participants aged ≥40 years were included: 286 were never-smokers with normal lung function, 297 ever-smokers with normal lung function at risk for COPD, and 600 with COPD of different severity stages (n = 361 GOLD I, n = 239 GOLD II-IV). CT imaging parameters included TAC and emphysema (LA950 = percentage of the lung with low attenuation areas below -950 Hounsfield units). Spirometry (FEV1) before and after bronchodilatation according to ATS/ERS guidelines was done at four times (at baseline, after 18 months, 36 months, and 54 months). Linear mixed effects regression models were performed for determining longitudinal changes (in ml). Chronic cough was defined as cough on most days for at least 3 months in two consecutive years.

Results: Adjusted for age, sex, BMI, race, smoking status, and baseline FEV1, chronic cough was highly associated (p<0.0001) with FEV1 decline over time in the entire study population. This was preserved even after adjustment for TAC and emphysema (p<0.0001).

Conclusions: Our data indicate that chronic cough is besides TAC and emphysema score—an independent determinant of decline in FEV1 in non-COPD and COPD subjects. Further studies are needed to assess underlying pathophysiological or structural characteristics behind chronic cough.
P38 | Structural features in chronic cough assessed by computed tomography (CT)

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Background: Features of airway remodelling in terms of bronchial airway wall thickening as well as emphysema have been reported in individuals with chronic cough. The aim of this study was to evaluate chronic cough prevalence and CT-assessed structural features of chronic cough within a general population.

Methods: From CanCOLD, a Canadian multi-center, population-based study, 1183 participants aged ≥40 years were included: 286 never-smokers with normal lung function, 297 ever smokers with normal lung function at risk for COPD, and 600 with moderate to severe COPD (n=361 GOLD I, n=239 GOLD II-IV). All performed thoracic CT scans. Imaging parameters assessed comprised of total airway count (TAC), airway wall thickness (WT), emphysema (LAA950 = percentage of the lung with low attenuation areas below -950 Hounsfield units) as well as parameters for functional small airway disease (SAD) quantification (PRM = parametric response mapping and DPM = disease probability measure). Chronic cough was defined as cough on most days for at least 3 months in two consecutive years.

Results: The prevalence of chronic cough was 7.6% in never smokers and significantly higher in up to 27% in the moderate-severe COPD group (II-IV). In individuals with chronic cough, independently of the presence of COPD, there were no significant differences in CT structural airway (TAC, WT, SAD) or emphysema measurements (LAA950) compared to the no chronic cough control group.

Conclusions: Our data indicate that individuals with chronic cough seem to have no specific structural CT features.

P39 | The German Asthma Net: Anti-IL5(R) therapy reduces disease burden in a real-life severe asthma cohort

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Introduction: 718 of 2283 patients with severe asthma included in the real-life, long-term German Asthma Net (GAN) registry used anti-IL5(R) antibody therapy (mepolizumab, benralizumab, reslizumab), of which 343 had started therapy after registry inclusion (56±13 yrs., 55% female, 1.7% current smokers, mean BMI 27.5±5 kg/m²; 4.6±4.6 exacerbations per year, ACQ score 2.9±1.4).

Results: In comparison to baseline, patients on anti-IL5(R) therapy showed significantly less exacerbations (rate reduction (mean ± SD) at year 1: −3.0±0.5, p<0.001; year 2: −3.1±4.3, p<0.001; year 3: −2.8±4.6, p=0.015; year 4: −3.2±3.6, p=0.020), significantly better asthma control as measured by ACQ-5 score (mean benefit: −1.2±1.5, p<0.001; −1.3±1.4, p<0.001; −1.1±1.2, p<0.001; −0.8±1.5, p=0.047), better quality of life as measured by mAQLQ score (mean benefit: 1.0±1.4, p<0.001; 1.0±1.3, p<0.001; 1.2±1.5, p=0.010), an increase in FEV1 (% predicted, mean % increase: 8.1±7, p<0.001; 10±18, p<0.001; 12±16, p=0.001; 10±18, p=0.018), and significantly reduced corticosteroid dependency (mean mg reduction: −3.6±11.7, p<0.001; −4.5±11.6, p<0.001; −5.1±8.4, p<0.001; −5.6±9.4, p=0.005).

Conclusions: Real-life, severe asthma patients treated with anti-IL5(R) biologics showed long-term benefits regarding pivotal outcome and disease control parameters including exacerbation rate, corticosteroid use, asthma control, quality of life, and lung function values, highlighting beneficial effects previously documented in controlled studies in a real-life severe asthma cohort.
The German Asthma Net: Anti-IL5(R) therapy reduces disease burden in a real-life severe asthma cohort in comparison to patients on maintenance OCS therapy

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348 of 2283 patients with severe asthma > 12 years included in the real-life, long-term German Asthma Net registry used anti-IL5(R) antibody therapy (mepolizumab, benralizumab, reslizumab; mean: 57 ± 13 years, 57 % female, BMI 27 ± 6 kg/m², 5 ± 5 exacerbations per year, ACQ score 2.6 ± 1.5), compared to 329 corticosteroid (OCS) dependent patients (49 ± 17 years, 55 % female, BMI 27 ± 6 kg/m², 4 ± 4 exacerbations/year, ACQ 2.6 ± 1.4).

Baseline ACQ, mAQLQ, and FEV1 values were comparable, patients on IL5(R) received more OCS at baseline (6 ± 11 vs 4 ± 10 mg, p = 0.021). In comparison to systemic corticosteroid dependent patients without biological therapy, patients on anti-IL5(R) therapy showed significantly better asthma control (ACQ-5 score), a better quality of life (mAQLQ score), and an increase in FEV1 in % predicted (all mean ± SD). OCS dependency (median [IQR]) was also significantly reduced.

Conclusions: Real-life, severe asthma patients treated with anti-IL5(R) biologics showed long-term benefits regarding piv-

FeNO in a healthy population: normal ranges and contributing factors

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Fractional exhaled nitric oxide (FeNO) is a type 2 inflammation marker used in the management of asthma. Current standards focus on thresholds to designate the presence and degree of local inflammation. However, epidemiological knowledge of FeNO values in general populations is needed to better understand the normal ranges and contributing factors.

In this analysis 3110 healthy probands without any history of respiratory diseases, atopy, inhaled medication use, current smoking, obstructive lung function and/or bronchial reversibility, aged 6–82 years with valid FeNO testing were included from the Austrian LEAD study, a single-centred, observational, longitudinal, general population cohort. The mean values and associations of FeNO with anthropometrics, non-respiratory diseases, history including symptoms, exposures, inflammatory parameters, allergy, and lung function were assessed. FeNO levels were affected as seen in the stratification and stepwise linear regression analyses.

Our data elucidate the considerable distribution of FeNO in both youth and adults of a large, respiratory healthy population, which is affected by factors like age, height, eosinophils, and lung function.

Abstract P41 | Tab. 1

| Difference to baseline: | Anti-IL5(R) | OCS | p-value |
|-------------------------|------------|-----|--------|
| ACQ, year 1             | -0.84 (1.5) | -0.43 (1.5) | 0.002  |
| ACQ, year 2             | -0.92 (1.4) | -0.15 (1.4) | <0.001 |
| mAQLQ, year 1           | 0.74 (1.4)  | 0.3 (1.2)   | <0.001 |
| mAQLQ, year 2           | 0.66 (1.4)  | 0.12 (1.2)  | 0.003  |
| FEV1%, year 1           | 5.8 (19)    | 3.2 (16)    | 0.07   |
| FEV1%, year 2           | 6.5 (19)    | 1.5 (16)    | 0.025  |
| OCS*, year 1            | 0.0 [-1.9, 0.0] | 0.0 [0.0, 0.0] | <0.001 |
| OCS*, year 2            | 0.0 [-4.8, 0.0] | 0.0 [0.0, 0.0] | 0.02   |

Abstract P40 | Fig. 1

The score and FEV1% improvements from baseline are portrayed as mean (± SD) for each therapy. *OCS dose reduction, shown as median [IQR], also showed a significant difference.
Abstract P43 | Real-world results of NGS testing in early-stage versus advanced-stage NSCLC in the LALUCA registry

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Background: There is little evidence whether drugable mutations are more frequent in early versus advanced-stage non-small cell lung cancer (NSCLC). The objective of this study was to compare the results of next-generation sequencing (NGS) test results in early-stage versus advanced-stage NSCLC in the real-world LALUCA (Landsteiner Lung Cancer) registry.

Methods: Newly diagnosed patients with NSCLC between May 2020 and April 2022 were included. At the time of data analysis, NGS test results of 319 patients were available. Early and advanced-stage was defined as stages I-IIIa and IIIB-IVB, respectively. Frequencies were compared by Fisher’s exact test.

Results: The mean age was 68 ± 9 years, and 52% were women. 119 (37%) and 200 (63%) had early-stage and advanced-stage lung cancer, respectively. The frequency and results of total outcome and disease control parameters, including asthma control, quality of life, lung function, and corticosteroid use, highlighting beneficial effects previously documented in controlled studies in a real-life severe asthma cohort. These effects appear to be superior to those obtained with OCS treatment.

Abstract P42 | Real-world quality of lung cancer care in the LALUCA registry

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Background: Continuous monitoring of the quality of care is essential for favourable outcomes in lung cancer patients. This study compared real-world data with classic quality benchmarks.

Methods: Based on the quality benchmarks developed by the UK National Lung Cancer Audit (NLCA), we analyzed the real-world quality of care in patients in the prospectively collected LALUCA (Landsteiner Lung Cancer) registry. Data of newly diagnosed lung cancer patients in two high volume centers between May 2020 and April 2022 were included in the registry.

Results: 537 patients were included (mean age 68 ± 10 years, 51% men). The results and benchmarks set by the NLCA are displayed in the table.

Conclusions: Data from the LALUCA registry indicate a high quality of care at the participating centers. Future quality goals include diagnosing more patients with early-stage disease and increasing reported staging completeness.

### Table 1

| Total patients, n=537 | Results from the LALUCA registry | Benchmark by NLCA 2019 | Commentary |
|-----------------------|---------------------------------|------------------------|------------|
| Reported completeness of staging in % | 88 | 95 | Not reached |
| Stage in % | | | |
| - I | 12 | For 2028: 75% in stages I and II | Benchmark unrealistic |
| - II | 9 | |
| - III | 30 | |
| - IV | 49 | |
| Availability of ECOG PS in patients in % | 96 | >95 | Reached |
| Patients with ECOG 0/1 and stage I/II | | | |
| - Availability of FEV1 in % | 81 | >75 | Reached |
| - Histological verification in % | 93 | >93 | Reached |
| Time from | | | |
| - symptom onset until first clinical contact | 47 days (IQR 92) | | |
| - first clinical contact until biopsy | 10 days (IQR 13) | | |
| - biopsy until histological verification | 5 days (IQR 7) | | |
| - first clinical contact until histological diagnosis | 14 days (IQR 21) | | |

Table: ECOG, Eastern cooperative Oncology Group; NLCA, National Lung Cancer Audit; PS, performance status; FEV1, forced expiratory volume in one second; IQR, interquartile range
NGS testing according to tumor stage are shown in the table. No ROS-1 mutations were found in this cohort.

**Conclusions:** In this real-world setting, the frequency of drugable mutations as detected by local NGS testing were similar in early and advanced-stage NSCLC.

**P44 | Prediction of immune checkpoint inhibitor (ICI) response in non-small cell lung cancer (NSCLC) patients using a microbiome-based biomarker**

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**Background:** Despite advances in immunotherapy, a significant number of NSCLC patients do not respond to ICI therapies or develop immune related adverse events (irAEs). Recent research indicates that the microbial signature may predict treatment success rates and thus aid in optimizing patient selection. BiomeOne® is a tumor-agnostic CE-IVD marked medical device that uses stool samples to analyse the intestinal microbiome. The aim of our study was to evaluate the prognostic potential of BiomeOne® in a cohort of NSCLC patients treated with ICI.

**Methods:** We recruited NSCLC patients with unresectable stage III and IV who underwent first line ICI therapy. Stool samples were collected prior to ICI therapy using an at-home collection kit. After DNA extraction, stool samples underwent 16S rRNA sequencing and bioinformatic analysis. The microbial profile of each sample was further analyzed with the proprietary selection. BiomeOne® is a tumor-agnostic CE-IVD marked medical device that uses stool samples to analyse the intestinal microbiome. The aim of our study was to evaluate the prognostic potential of BiomeOne® in a cohort of NSCLC patients treated with ICI.

**Results:** A total of 42 stage III/IV NSCLC patients (age 48–83 years, mean 66.57 ± 8.78; 58.9% male; 24% in stage III and 76% in stage IV) from two institutions were enrolled in this study. 95.5% of patients received PD1/PDL1 therapy and 4.5%—CTLA4/PD1; 68.8% of patients had some irAEs. The BiomeOne® test had an overall sensitivity of 80.6% and a specificity of 54.5% in predicting the response to ICI therapy in this cohort (see Table 1).

**Conclusions:** The newly developed non-invasive stool test can be used in clinical practice as a predictive test of the ICI response in NSCLC patients. To confirm these results, biomarker analysis in a larger patient cohort is required.

**OGTC FREIE VORTRÄGE**

**V01 | Validation of lymphocyte-to-monocyte ratio as an independent prognostic factor in surgically treated small cell lung cancer: an international multicenter analysis**

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**Background:** The prognostic impact of the preoperative lymphocyte-to-monocyte ratio (LMR) has been already evaluated in several malignancies. In addition, we have previously demonstrated that elevated LMR associates with improved clinical outcome in a small cohort of patients receiving surgery for small cell lung cancer (SCLC). Aim of the study was to test the robustness of preoperative LMR as a predictor of postoperative outcome in a large international multicentric surgical SCLC cohort.

**Methods:** Patients undergoing surgical resection for limited-stage SCLC between January 2000 and December 2019 from three collaborating European institutions have been retrospectively included. The most recent preoperative blood work was used to calculate LMR. Optimal cut-off values of LMR were determined and correlated with survival data of the study cohort.

**Results:** In total, 101 individuals have been investigated. Of these, 63 (62.4%) were male and the median age was 63 years (range 41–80). A lobectomy was performed in 69 (68.3%) cases and adjuvant chemotherapy was administered in 59 (58.4%) patients. LMR > 2.50 significantly correlated with longer overall survival.
Abstract V01 | Fig. 1

Background: Minimally invasive anatomic segmentectomy is increasingly performed as surgical treatment for early-stage lung cancer. Aim of this work is the retrospective evaluation of video-assisted thoracoscopic (VATS) segmentectomies in comparison to VATS lobectomies. VATS-segmentectomy and VATS-lobectomy were compared with respect to demographic data, perioperative outcomes, and oncologic outcomes. Two further subgroups were compared for VATS-segmentectomy regarding identification of the intersegmental plane: an inflation-deflation-group and an ICG-group.

Methods: Our institutional database was queried for patients with primary surgical treatment for lung cancer or suspicion of lung cancer. Patients with extended resections or more complex surgery than lobectomy, and patients after neoadjuvant therapy were excluded. The study population consisted of 816 patients (VATS-segmentectomy $n=91$, VATS-lobectomy $n=725$). For comparison of oncologic results only patients with pT1a or pT2b and pN0 staging were analyzed.

Results: The most common indication for surgical intervention was lung cancer (95.6%), of which adenocarcinoma was predominant (65.2%). Benign lesions (2.2%) and metastases (2.2%) were less frequent. Comparison of perioperative outcome showed significantly fewer postoperative complications (28.9 vs. 46.4%, $p=0.015$) and less prolonged air fistulas (2.2 vs. 11%, $p=0.007$) after VATS-segmentectomy. Chest tube duration was significantly shorter in the segmentectomy group (3 vs. 4 days, $p=0.020$). Postoperative stay was significantly shorter in the ICG group (5 vs. 7 days, $p=0.039$). Regarding oncologic outcome, VATS-segmentectomy was not inferior to VATS-lobectomy in terms of overall survival (lobectomy 100 vs. segmentectomy 117 months, $p=0.213$) and disease-free survival (lobectomy 89 vs. segmentectomy 108 months, $p=0.312$).

Conclusions: The results of this study confirm that VATS-segmentectomy, in a specific patient cohort, is superior to VATS-lobectomy in terms of postoperative complications, air fistula rate, and shorter drainage duration without compromising oncologic results.

V02 | Evaluation of surgical and oncologic outcome after VATS segmentectomy in comparison to VATS lobectomy

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Abstract V01 | Fig. 1

survival (OS, 35.3 vs. 20.7 months, $p=0.032$, Fig. 1A) and disease-free survival (DFS, 25.8 vs. 18.5 months, $p=0.011$, Fig. 1B). Ultimately, multivariate Cox proportional hazard analysis confirmed LMR > 2.50 as an independent predictor of favorable OS (hazard ratio [HR] 0.617; 95% confidence interval [CI] 0.383-0.993; $p=0.047$) and DFS (HR 0.505; 95% CI 0.266-0.959; $p=0.037$).

Conclusions: Preoperatively elevated LMR is a robust predictor of favorable clinical outcome and may serve as a novel prognostic biomarker when applying surgery in SCLC. Further studies are indicated to evaluate the role of LMR in SCLC.

V03 | Expression and prognostic value of thyroid-hormone-associated proteins in surgically resected small cell lung cancer: a pilot study

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Abstract V03 | Fig. 1 NIS Expression and Overall Survival

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Background: Small cell lung cancer (SCLC) is characterized by fast growth and early metastasis, leading to an extraordinarily unfavourable prognosis for patients across all stages with 5-year survival rates far below 10%.

Thyroid hormone associated proteins including MY-crystallin (CRYM), sodium iodide symporter (NIS) and thyroid hormone receptor beta (THRB) have been previously shown to demonstrate prognostic and therapeutic significance in multiple malignancies.

However, their clinical relevance in SCLC has not been widely investigated so far. Aim of this study was to evaluate the expression and prognostic value of CRYM, NIS and THRB in SCLC.

Methods: Surgically resected tissue microarray (TMA) specimens from patients receiving surgery at the National Koranyi Institute between 1978 and 2016 with histologically confirmed SCLC have been retrospectively collected. Immunohistochemistry (IHC) was performed for CRYM/NIS/THRB and expression results have been correlated with clinicopathological characteristics of the study cohort.

Results: In total, 106 patients have been included. 81 patients (78%) were male and the median age was 57 years (range 37–79 years). 63 of 106 of the investigated cases were diagnosed with stage I or II SCLC. NIS, CRYM and THRB expression was present in 94%, 41% and 12% of the cases, respectively. There was no significant correlation between CRYM or THRB expression and clinical outcome. However, patients with elevated NIS positivity had a significantly improved OS (27.1 months vs. 13.3 months, p=0.0052, Fig. 1).

Conclusion: CRYM, NIS and THRB are heterogeneously expressed in SCLC. Notably, NIS is highly present in SCLC and therefore, evaluation of radionuclide therapy may be indicated. Moreover, increased NIS expression might represent a novel prognostic biomarker in patients undergoing surgery for SCLC. Further studies are warranted to investigate the role of thyroid hormone associated proteins in SCLC.

V04 | Insertion of single site dual-lumen catheters via alternative venous access for extra corporal membrane oxygenation

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Background: Single site dual-lumen catheters have become an increasingly popular option to provide veno-venous extra corporal membrane oxygenation (VV-ECMO) support for patients in acute respiratory failure. The given anatomic conditions make cannulation via the right internal jugular vein (RIJV) the typical approach. Some scenarios although, can make this venous access inaccessible. Dual-lumen catheters are usually not considered in these cases. This multi-center case series aims to demonstrate that single site cannulation via an alternative venous access can be a safe and effective alternative in these scenarios.

Methods: All patients receiving an alternative venous access dual-lumen cannulation between January 2011 and April 2022 at three major centers were included in this multi-institutional analysis. We collected baseline demographic data including underlying diagnosis, type of respiratory failure, reason for atypical cannulation and outcome reports. Additionally, we collected technical data as well as complications related to the cannulation.

Results: A total of 18 patients with acute respiratory failure received VV-ECMO support with a dual-lumen catheter cannulated via an alternative venous access. Venous access included the right or left subclavian vein in ten patients, the right or left femoral vein in five patients and the left internal jugular vein in three patients. Cannulation was performed with guidewire and imaging support with sequential X-rays in 3 cases, fluoroscopy in 10 cases and transesophageal echocardiography in 5 cases. While one patient had bleeding at cannulation site that was managed conservatively and one patient required change of ECMO configuration, no serious adverse events occurred during cannulation in this patient cohort.

Conclusions: In this multi-center case series, we were able to demonstrate the feasibility of single site dual-lumen catheters cannulated via an alternative venous access. This provides valuable clinical information for physicians treating patients with inaccessible RIJV in acute respiratory failure.

V05 | Pre- and postoperative functional outcome in patients receiving laryngotraheal surgery

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Background: Small cell lung cancer (SCLC) is characterized by fast growth and early metastasis, leading to an extraordinarily unfavourable prognosis for patients across all stages with 5-year survival rates far below 10%.

Results: In total, 106 patients have been included. 81 patients (78%) were male and the median age was 57 years (range 37–79 years). 63 of 106 of the investigated cases were diagnosed with stage I or II SCLC. NIS, CRYM and THRB expression was present in 94%, 41% and 12% of the cases, respectively. There was no significant correlation between CRYM or THRB expression and clinical outcome. However, patients with elevated NIS positivity had a significantly improved OS (27.1 months vs. 13.3 months, p=0.0052, Fig. 1).

Conclusion: CRYM, NIS and THRB are heterogeneously expressed in SCLC. Notably, NIS is highly present in SCLC and therefore, evaluation of radionuclide therapy may be indicated. Moreover, increased NIS expression might represent a novel prognostic biomarker in patients undergoing surgery for SCLC. Further studies are warranted to investigate the role of thyroid hormone associated proteins in SCLC.
Background: Nowadays, a variety of techniques for treating laryngotracheal stenosis have been described. Depending on the extent of the surgical procedure, surgery may affect the laryngeal function, such as voice and swallowing function. However, larger studies in this field are still missing, especially for extended laryngotracheal surgery.

Methods: In this retrospective analysis, all patients who underwent laryngotracheal surgery at the Department of Thoracic Surgery at the Medical University of Vienna between 01/2017 and 06/2021 were analyzed regarding the functional outcome (breathing, swallowing and voice). The study was approved by the Ethics Committee of the Medical University of Vienna (#1735/2020).

Results: A total of 45 patients were included in the final analysis. The mean age was 52 years (26–78). 89% were female. 67% of the stenoses were idiopathic and 51% of the patients were pre-treated. The majority of the stenoses were Myer-Cotton III (89%). 11% received standard cricotracheal resection (CTR), 49% received CTR with dorsal mucosal flap, 24% received CTR with lateral cricoplasty and 16% received single-stage laryngotracheal resection. The median hospital stay was 6 days (3–16), there was no in-hospital mortality. Functional outcome showed a reduction in voice pitch from 199.2 ± 41.7 Hz to 151.4 ± 50.0 Hz (p < 0.001) and the overall mean voice profile changed from a R0B0H0 to a R1B0H1. The dynamic voice range decreased from 23.5 ± 5.8 to 17.6 ± 6.7 semitones postoperatively (p < 0.001). There were no differences in voice volume after surgery (60.0 ± 4.1 dB vs. 60.2 ± 4.8 dB, p = 0.788). Postoperatively, all patients had full oral intake and sufficient deglutition. The peak expiratory flow improved significantly from 48.4 ± 17.0% to 89.3 ± 15.4% (p < 0.001).

Conclusions: In experienced centers, airway stenosis can be treated with excellent results. Even after extended laryngotracheal procedures, the respiratory function restored while preserving voice and swallowing.

V07 FGF18 is significantly decreased in the plasma of mesothelioma patients but not linked to prognosis

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Background: Malignant pleural mesothelioma (MPM) is a rare malignancy with dismal prognosis and a lack of reliable biomarkers. Despite the numerous advances in treatment approaches in recent years, the median overall survival (OS) remains poor ranging from 10 to 22 months. The addition of clinically useful biomarkers to the invasive diagnostic techniques is imperative to guide diagnosis and patient stratification. We have previously found elevated fibroblast growth factor 18 (FGF18) expression in MPM tissue specimens. The objective of this study was to evaluate its suitability as a circulating biomarker in MPM.

Methods: FGF18 gene expression was analyzed by real-time PCR and in silico. Plasma was collected from 40 MPM patients, 6 patients with benign fibrosis and 40 healthy controls. Circulating FGF18 was measured by ELISA and correlated to clinicopathological parameters and survival.

Results: MPM cell lines showed high gene expression of FGF18 and MPM patients with high FGF18 gene expression showed a trend towards longer OS in the TCGA dataset. Circulating FGF18 was significantly lower in patients with MPM and benign fibrosis (P = 0.004) when compared to healthy controls (P < 0.001). Non-epithelioid histology showed a slight, however not significant, tendency towards higher plasma FGF18 levels (P = 0.205) when compared to epithelioid morphology. Epithelioid histology held a prognostic value in the univariate analysis (P = 0.027), it was not, however, found to be an independent prognostic factor on multivariate analysis (P = 0.123). Median OS for the entire cohort was 622 days. Overall, no significant association of circulating FGF18 with OS of MPM patients could be observed (median survival 725 versus 567 d, HR 1.177, 95% CI 0.537-2.580, P = 0.685 in low and high FGF18 groups, respectively).
Conclusions: Despite high FGF18 gene expression in MPM cell lines and tissue, circulating FGF18 was not found to be a suitable prognostic biomarker. The diagnostic value of decreased FGF18 warrants further investigation.

V08 Safety of surgical treatment of Congenital Pulmonary Airway Malformation (CPAM): a retrospective study

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Background: Congenital Pulmonary Airway Malformation (CPAM), describes a benign congenital form of lung dysplasia. It occurs in up to 1:11,000–35,000 live births. Although it represents the most common form of fetal lung lesions (30–40%), the optimal course of treatment is still heavily discussed. Regarding symptomatic patients the current gold standard is operative resection during the first year of life. Due to possible infection or malignant transformation, surgical resection is also discussed for asymptomatic children.

To evaluate the safety of surgical resection, we retrospectively analyzed data of surgical patients treated at our center.

Methods: All patients undergoing surgical resection for CPAM between 01.01.2000–01.08.2022 were included. We analyzed data according to methods of surgical resection, age at diagnosis and resection, postoperative outcome and length of stay (LOS).

Results: In total, 7 boys and 4 girls were included. In 7 cases diagnosis was obtained prenatally, in 57% on prenatal ultrasound during pregnancy week 14–22. The remaining 4 children were diagnosed in the first month of life (n=2) or at elementary school age (n=2). Four children were symptomatic (3 female). Ten underwent open resection via thoracotomy with lobectomy of the affected lobe and in one case wedge resection via thoracoscopy. Median age at resection was 10 months (asymptomatic 10 months, symptomatic 6.5 months). There was no major morbidity. Average postoperative stay on the pediatric intensive care unit was 3.6 days with a total LOS of 9.4 days (5.8 pediatric ward). Asymptomatic patients were dismissed after 9 days (symptomatic after 9.5).

Conclusions: This study underlines the safety of surgical resection in CPAM patients. LOS was shorter in asymptomatic patients. However, evidence-based recommendations are necessary regarding the indication of resection and optimal timing and course of treatment of asymptomatic children. With increasing experience of minimally-invasive anatomic resections, video-assisted approaches might be feasible also in CPAM patients.

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