Respiratory Update 2022

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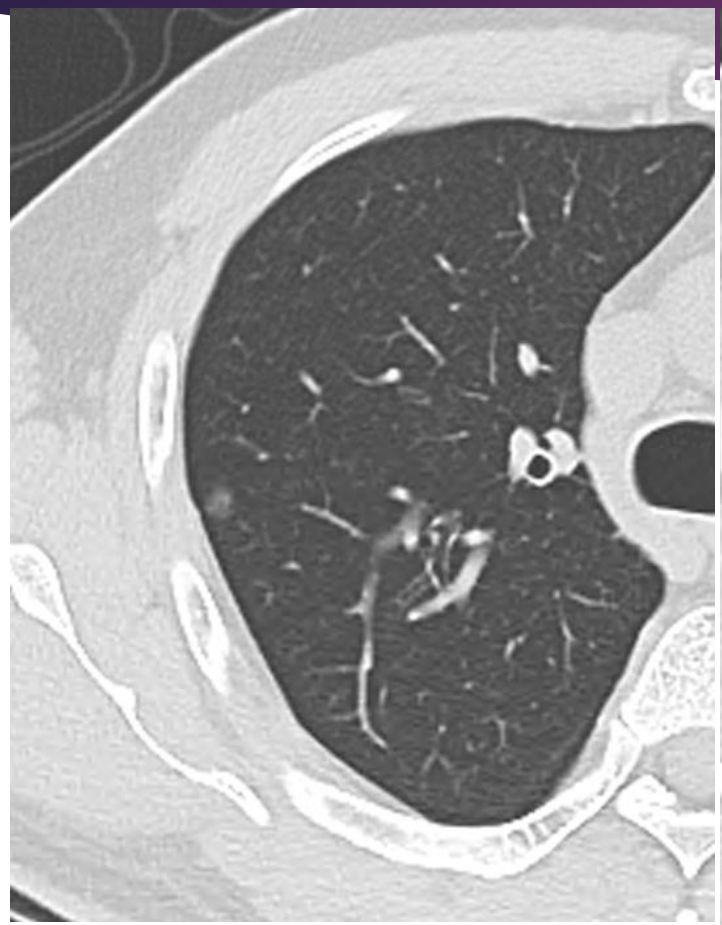
Outline

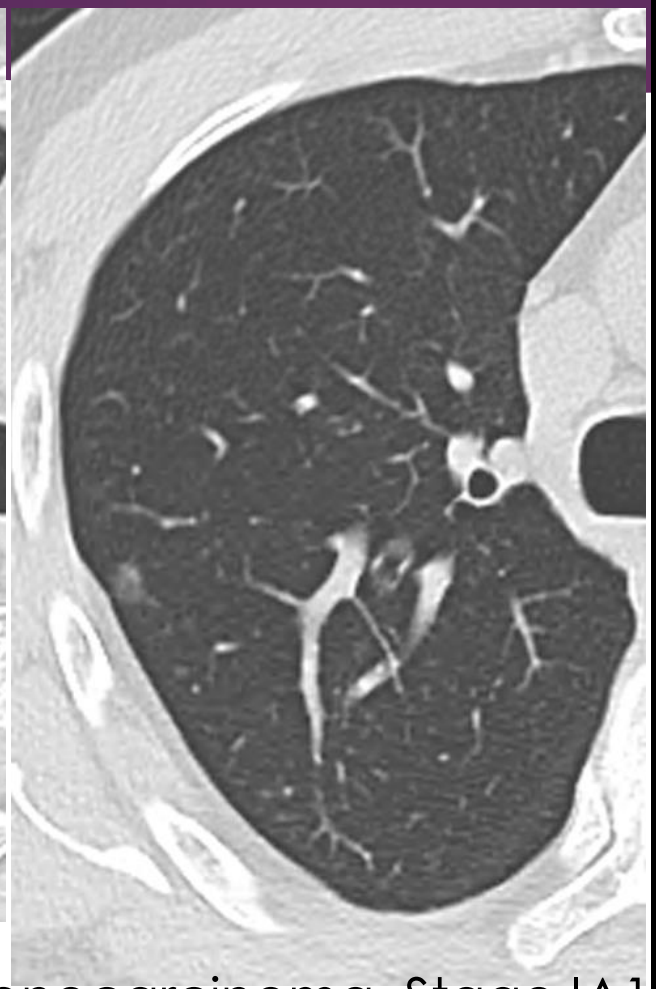
- Nodule & Lung cancer
- Asthma
- COPD
- Covid (Long)

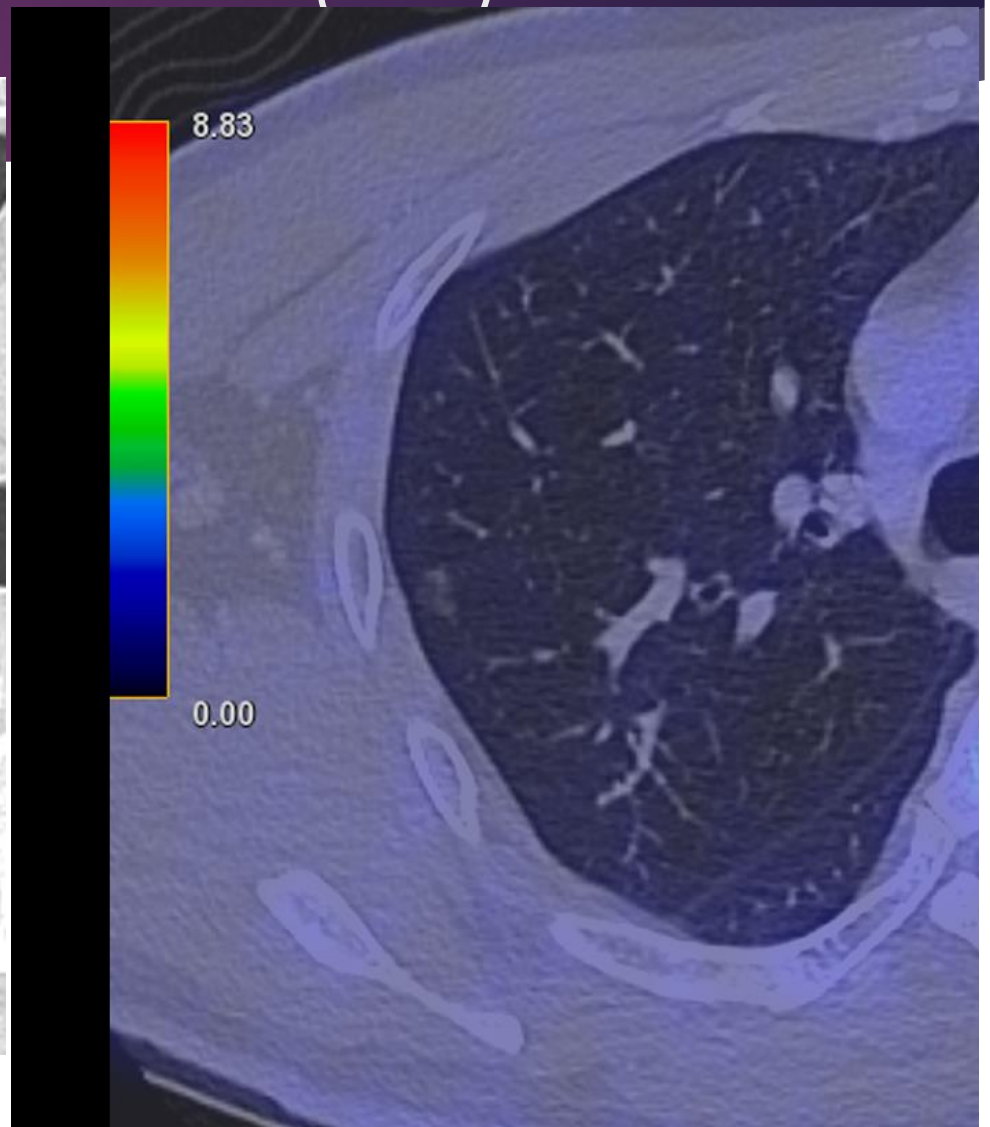
Nodule case

- 42 year old Chinese man never smoker, fit and well
- Mum died aged 46 with lung cancer as never smoker
- Vague chest pain musculoskeletal in nature keen for a CT scan

2018 (6x5mm)->2019 (7x6mm)->2020 (8x7)







Final diagnosis, 9.5 mm T1a Adenocarcinoma, Stage IA1

Nodules & Cancer

- Most nodules are benign
- <5 mm as per BTS or <6 mm Fleishner no follow up required
  - But cancer starts somewhere and characteristic of nodule matters
- NZ screening will come at some point (probably 4-5 years away)
- Non-smoker adenocarcinoma more common now
  - NZ 10-20% of all lung cancers, Taiwan 50% respectively in lung cancer patients
- 5 year follow up for cure but no guidelines for surveillance
  - Remember they have had cancer so higher risk than usual screening group!

Fleishner 2017 guidelines

Pulmonary Nodule Size	Lung Nodule Type	Single vs. Multiple	Low Risk Patient	High Risk Patient
< 6mm ($< 100mm^3$)	Solid	Solitary	No Follow-Up If suspicious morphology or upper lobe location, consider 12-month follow-up.	Optional CT in 12 months
		Multiple	No Follow-Up If suspicious morphology or upper lobe location, consider 12-month follow-up.	Optional CT in 12 months
	Part-Solid (Subsolid)	Solitary	No Follow-Up	
		Multiple	CT in 3 to 6 months. If unchanged, consider CT at 2 and 4 years.	
	Ground-Glass	Solitary	No Follow-Up If suspicious, consider follow-up at 2 and 4 years. If grows or increasingly solid, consider resection.	
		Multiple	CT in 3 to 6 months. If unchanged, consider CT in 2 and 4 years.	
6 to 8mm ($100-250mm^3$)	Solid	Solitary	CT in 6 to 12 months, then **consider** CT in 18 to 24 months.	CT in 6 to 12 months, then **obtain** CT in 18 to 24 months.
		Multiple	CT in 3 to 6 months, then **consider** CT in 18 to 24 months	CT in 3 to 6 months, then **obtain** CT in 18 to 24 months
	Part-Solid (Subsolid)	Solitary	CT in 3 to 6 months to confirm persistance. If unchanged and solid component below 6mm, CT annually for 5 years. **Persistent part-solid nodules containing a solid componment > 6mm are highly suspicious.**	
		Multiple	CT in 3 to 6 months. Then management based on most suspicious nodule(s).	
	Ground-Glass	Solitary	CT in 6 to 12 months to confirm persistence, then CT every 2 years until 5 years. If grows or increasingly solid, consider resection.	
		Multiple	CT at 3 to 6 months. Then management based on most suspicious nodule(s).	
> 8mm ($> 250mm^3$)	Solid	Solitary	In 3 months consider either CT, Biopsy, or PET-CT (however, negative PET-CT does not exclude low-grade malignancy, FDG uptake may be underestimated in small nodules < 1cm, or those close to diaphragm)	
		Multiple	CT in 3 to 6 months, then **consider** CT at 18 to 24 months	CT in 3 to 6 months, then **obtain** CT at 18 to 24 months
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<u>Lung Cancer Risk Factors:</u>

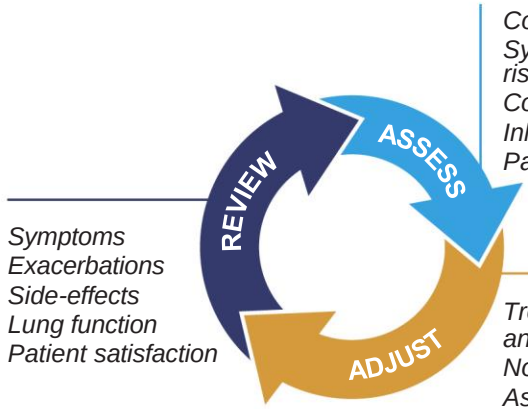
- Tobacco use
- Family history of lung cancer.
- Upper pulmonary lobe location of nodule.
- Presence of emphysema.
- Pulmonary fibrosis.
- Older Age.
- Female gender.

Asthma Case

- 49 year old seen at bronchoscopy for EBUS to lymph nodes ?lymphoma recurrence
- Asthma & Hay fever long standing with SPT positive
- Only been using Ventolin now for years, increasing use for weeks now.
- GP started on Flixotide and short course of steroids day prior
- Had wheeze prior procedure

Adults & adolescents 12+ years

Personalized asthma management
Assess, Adjust, Review
for individual patient needs



Confirmation of diagnosis if necessary
Symptom control & modifiable risk factors (see Box 2-2B)
Comorbidities
Inhaler technique & adherence
Patient preferences and goals

Symptoms
Exacerbations
Side-effects
Lung function
Patient satisfaction

Treatment of modifiable risk factors and comorbidities
Non-pharmacological strategies
Asthma medications (adjust down/up/between tracks)
Education & skills training

CONTROLLER and **PREFERRED RELIEVER**
(Track 1). Using ICS-formoterol as reliever reduces the risk of exacerbations compared with using a SABA reliever

STEPS 1 – 2	STEP 3	STEP 4	STEP 5
As-needed low dose ICS-formoterol	Low dose maintenance ICS-formoterol	Medium dose maintenance ICS-formoterol	Add-on LAMA Refer for assessment of phenotype. Consider high dose maintenance ICS-formoterol, ± anti-IgE, anti-IL5/5R, anti-IL4R, anti-TSLP
RELIEVER: As-needed low-dose ICS-formoterol			

See GINA severe asthma guide

CONTROLLER and **ALTERNATIVE RELIEVER**
(Track 2). Before considering a regimen with SABA reliever, check if the patient is likely to be adherent with daily controller

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5
Take ICS whenever SABA taken	Low dose maintenance ICS	Low dose maintenance ICS-LABA	Medium/high dose maintenance ICS-LABA	Add-on LAMA Refer for assessment of phenotype. Consider high dose maintenance ICS-LABA, ± anti-IgE, anti-IL5/5R, anti-IL4R, anti-TSLP
RELIEVER: As-needed short-acting beta$_2$-agonist				

Other controller options for either track (limited indications, or less evidence for efficacy or safety)	*Low dose ICS whenever SABA taken, or daily LTRA, or add HDM SLIT*	*Medium dose ICS, or add LTRA, or add HDM SLIT*	*Add LAMA or LTRA or HDM SLIT, or switch to high dose ICS*	*Add azithromycin (adults) or LTRA. As last resort consider adding low dose OCS but consider side-effects*

GINA 2022, Box 3-5A

Asthma Main points

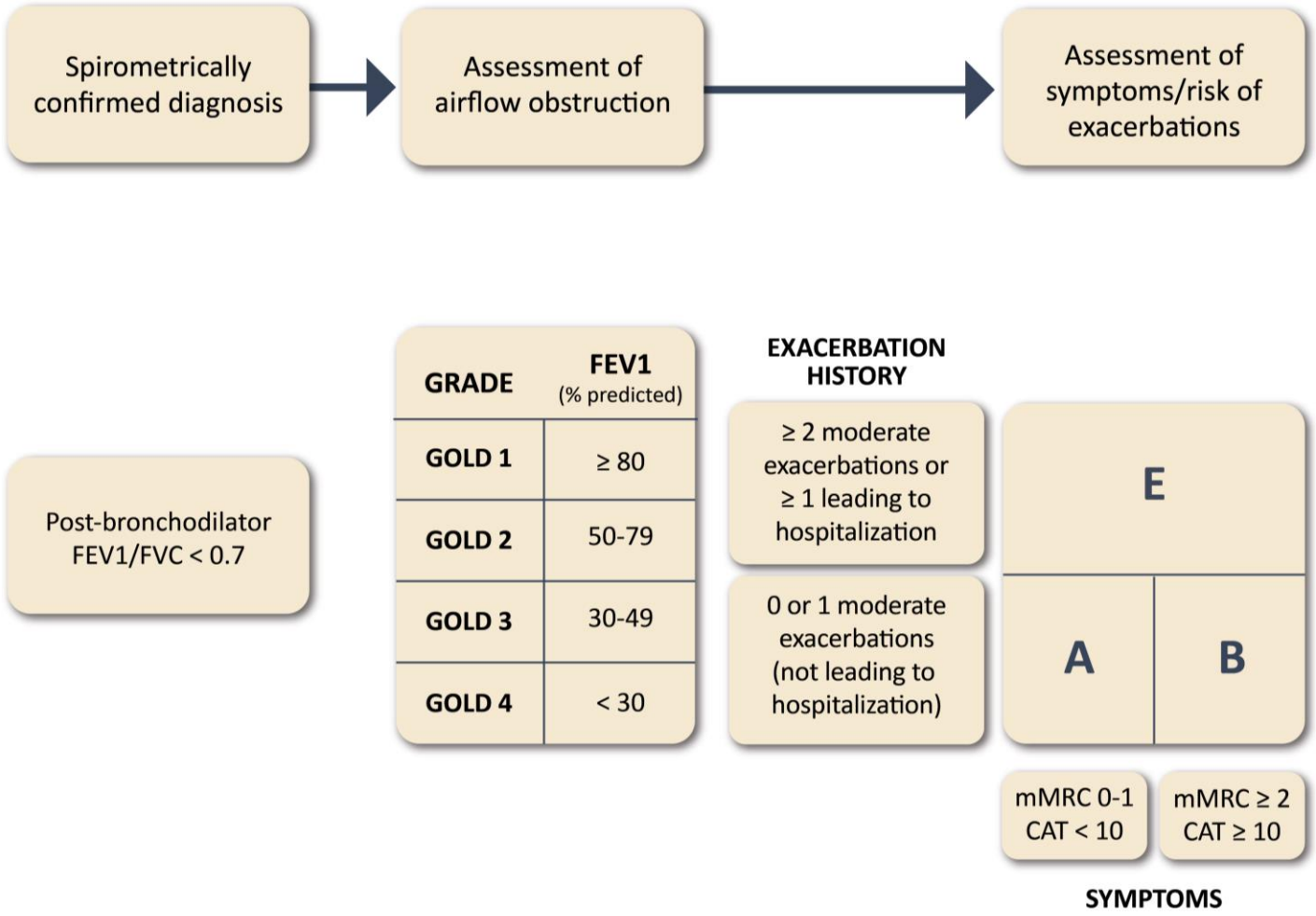
- No SABA use only, as risk of exacerbations and mortality
- Meta analysis showed 55% reduction in severe exacerbation alone even in mild asthma
  - Whether track 1 or track 2
- Covid, severity and mortality: no impact in well controlled asthma,
  - Still continue biologics and oral steroids as prescribed
- E-cigarettes increase risk of symptoms and exacerbations

COPD

- Taxonomy for COPD proposed,
  - G-gene, D-lung development, C-cigarette, P-biomass pollution, I-infection, A-asthma, U-unknown
- Lung health management still key
  - Keeping active, warm and well, hand hygiene, face masking, vaccinations, optimizing inhalers, pulmonary rehab and early treatment of exacerbations

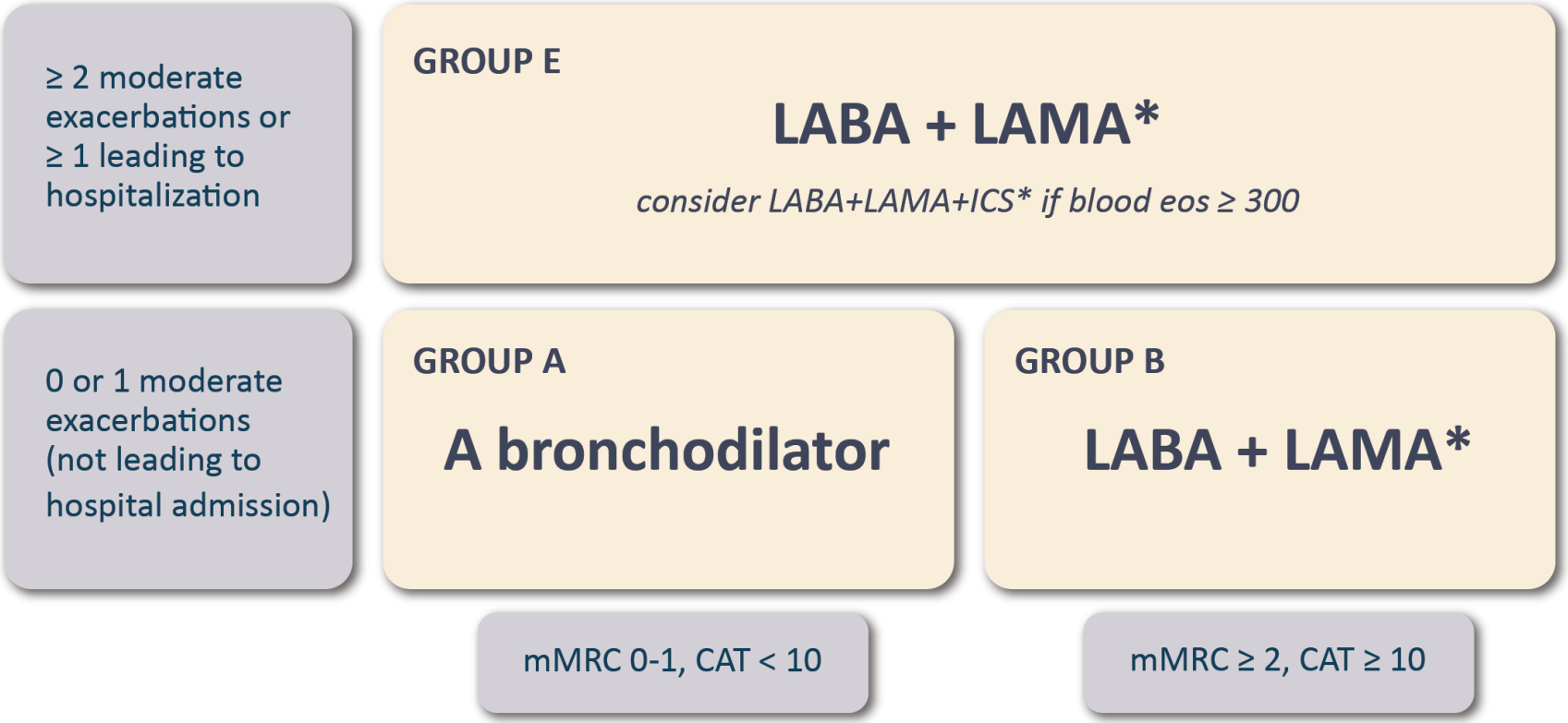
GOLD ABE Assessment Tool

Figure 2.3



Initial Pharmacological Treatment

Figure 4.2



*single inhaler therapy may be more convenient and effective than multiple inhalers

Factors to Consider when Initiating ICS Treatment

Figure 3.1

Factors to consider when adding ICS to long-acting bronchodilators:

(note the scenario is different when considering ICS withdrawal)

STRONGLY FAVORS USE	**History of hospitalization(s) for exacerbations of COPD[#]**
	≥ 2 moderate exacerbations of COPD per year[#]
	Blood eosinophils ≥ 300 cells/µL
	History of, or concomitant asthma
FAVORS USE	1 moderate exacerbation of COPD per year[#]
	Blood eosinophils 100 to < 300 cells/µL
AGAINST USE	**Repeated pneumonia events**
	Blood eosinophils < 100 cells/µL
	History of mycobacterial infection

[#]despite appropriate long-acting bronchodilator maintenance therapy (see Table 3.4 and Figure 4.3 for recommendations);
*note that blood eosinophils should be seen as a continuum; quoted values represent approximate cut-points; eosinophil counts are likely to fluctuate.

COPD to live longer

- Stop smoking
- Long term oxygen therapy
- Early pulmonary rehab <4 weeks of discharge
- Triple therapy in Mod/Severe COPD with exacerbations
  - IMPACT HR 0.72 (95% CI: 0.53.0.99)
  - ETHOS HR 0.51 (95% CI: 0.33,0.80)
- NIV/Lung volume reduction surgery
- Managing comorbidities (cardiovascular, reflux, osteoporosis, mental health, cognitive impairment, frailty)

Covid and COPD

- Same as asthma continue usual medications
- Treat exacerbations with routine medications
- Usual Covid treatment indicated
- No increased risk of getting covid infection per se
- Increased risk of hospitalization and mortality

COVID (Long)

- In New Zealand, we divide long COVID into 2 groups:
  - Ongoing symptomatic COVID-19 — you can experience signs and symptoms of COVID-19 for 4 to 12 weeks after your initial infection.
  - Post-COVID-19 syndrome — when you have signs and symptoms that develop during or after an infection. These continue for more than 12 weeks and are not explained by any other conditions.

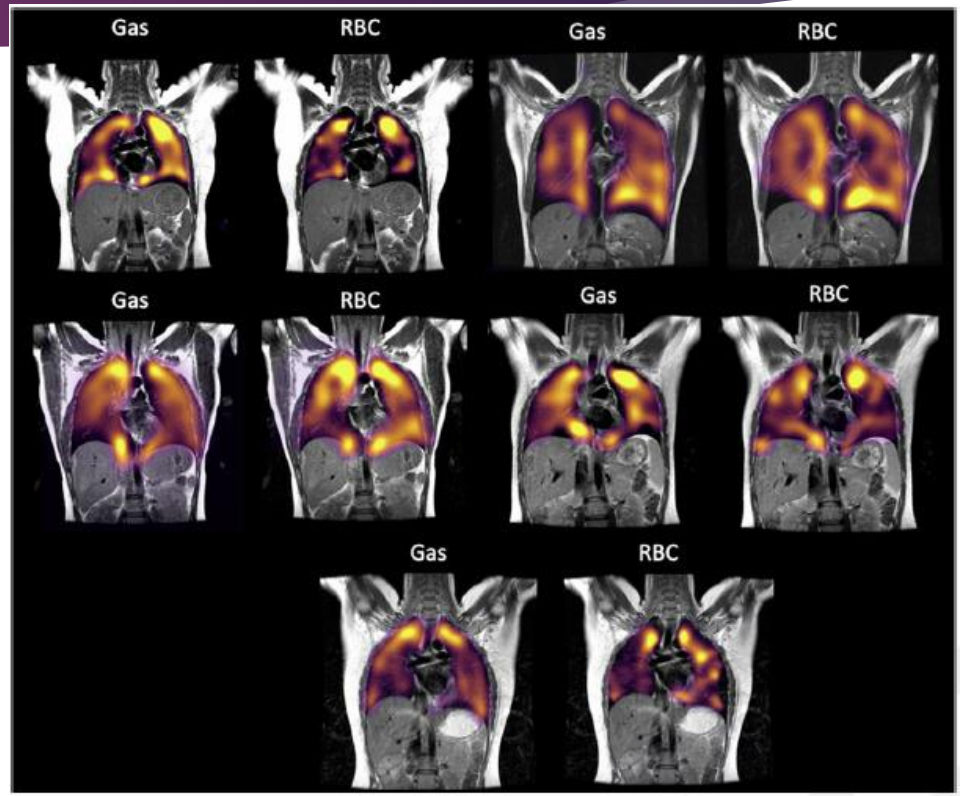
- Consequences for covid from routine respiratory expectations
  - Pneumonitis and Organising pneumonia and resultant scarred lungs
  - Thromboembolic disease

35 year old 3/12 post COVID

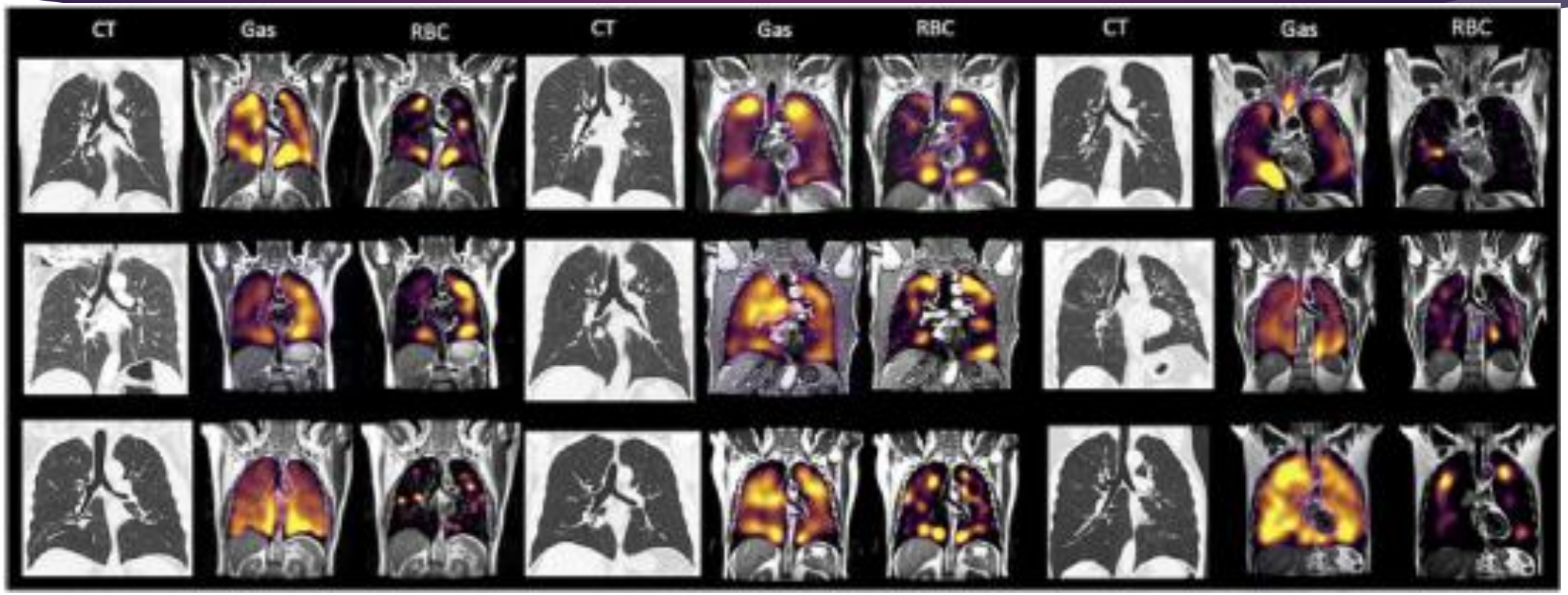
- HRCT normal
- Lung functions normal and excluded asthma for good measure
- Cardiopulmonary exercise test, VO2 34.4 (104% predicted), Anaerobic threshold >60%, There is no ventilatory or flow limitation and no desaturation occurred. Cardiac parameters and exercise ECG are unremarkable
- V/Q at 6/12 later showed perfusion defect in the superior segment of the left lower lobe found.
- Cardiology clearance at 7/12 with normal ETT and echo (no pulmonary hypertension)
- Haematologist CTPA at 9/12 no residual PE

Hyperpolarized 129Xe MRI Abnormalities

- Pilot studies initially in 3/12 post covid patients
- Then another pilot in normal, hospitalized (non-severe) and community covid
- Needs specialized MRI for polarasing Xenon and Xenon gas for inhalation and special MRI coils
- Reflect poor gas exchange not picked up on DLCO testing



Patients with normal CTs and DLCO but abnormal 129XE MRI



Intrapulmonary shunt and alveolar dead space in a cohort of patients with acute COVID-19 pneumonitis and early recovery

- Even in mild- moderate covid, disconnect with hypoxaemia with hyperventilation
- Elevated P_{A-aO2} gradient usually, either V/Q mismatch, shunt or DLCO
- Study done with concurrent P_{A-aO2} and P_{a-ACO2}
- 2 distinct pathophysiological process
  - Shunt ie patchy alveolar filling/oedema/atelectasis
  - Increase alveolar dead space ie, patchy pulmonary emboli resulting in high V/Q
- Over time, shunt recovers but alveolar dead space can persist

Questions

THANKS FOR LISTENING!