Moving Forward with COPD

BETTY POOT

NURSE PRACTITIONER

APRIL 2018

Outline for this session

- Quiz
- Current treatments
- Future challenges

Question 1

In what year is the earliest reference to emphysema recorded?

a. 1860
b. 1909
c. 1679
d. 1950

Answer: c)

In 1679 Swiss physician named Theophile Bonet performed over 3,000 autopsies on patients he followed, and was among the first to describe emphysema as a medical condition of "voluminous lungs“

Further descriptions included ‘lungs that do not collapse’, ‘chronic mucus catahrr’, ‘inflammation of the mucous membrane’ and ‘dilations of the air cells and tubes’.

Current description of COPD

- In COPD there is
  - Abnormal and permanent enlargement of the airspaces distal to the terminal bronchioles
  - Associated with destruction of the alveolar walls
  - A loss of elastic recoil, early airway closure during exhalation, and air trapping in the distal air spaces.
  - Alveolar wall destruction with formation of emphysematous bullae leading to loss of gas exchange
  - Air trapping and hyperinflation press and flatten the diaphragm which causes the respiratory muscles to overstretch
  - All these processes lead to the feeling of shortness of breath

Future treatment focus

- Departure of the ‘one size fits all’ treatment regimes based on FEV1 alone
- To a focus on identifying COPD phenotypes, such as
  - Nonexacerbators
  - Frequent exacerbators with chronic bronchitis
  - Frequent exacerbators without chronic bronchitis
  - Asthma-COPD overlap (ACOS)
- Enabling clinicians to have better prognostic information
- Enabling more targeted therapy and individualised treatment regimes

Question 2

What was René Laënnec famous for?

a) Inventing the stethoscope
b) Recognising that exercise is important for those who have a lung disease
c) Inventing the first atomizer (inhaler device)
d) Popularising French pastries

Answer: a)

René Laënnec was a French physician who invented the stethoscope in 1821. He perfected the art of auditory examination of the chest.

Through his work as a clinician and pathologist he became the first to distinguish chronic bronchitis and emphysema as separate entities from asthma. He recognised that emphysema lungs were hyperinflated and did not empty well.

Today – COPD assessment

- The stethoscope is still an important assessment tool
- However it is only one part of the assessment, others include
  - Clinical history , including symptoms, past medical, medication, and social history
  - Diagnostic tools, such as spirometry, full lung function testing, chest xray, CT scan, blood tests, 6MWT
  - Indices, such as the COPD assessment test (CAT), St George's respiratory questionnaire, dyspnoea scales (MMRC)

The future

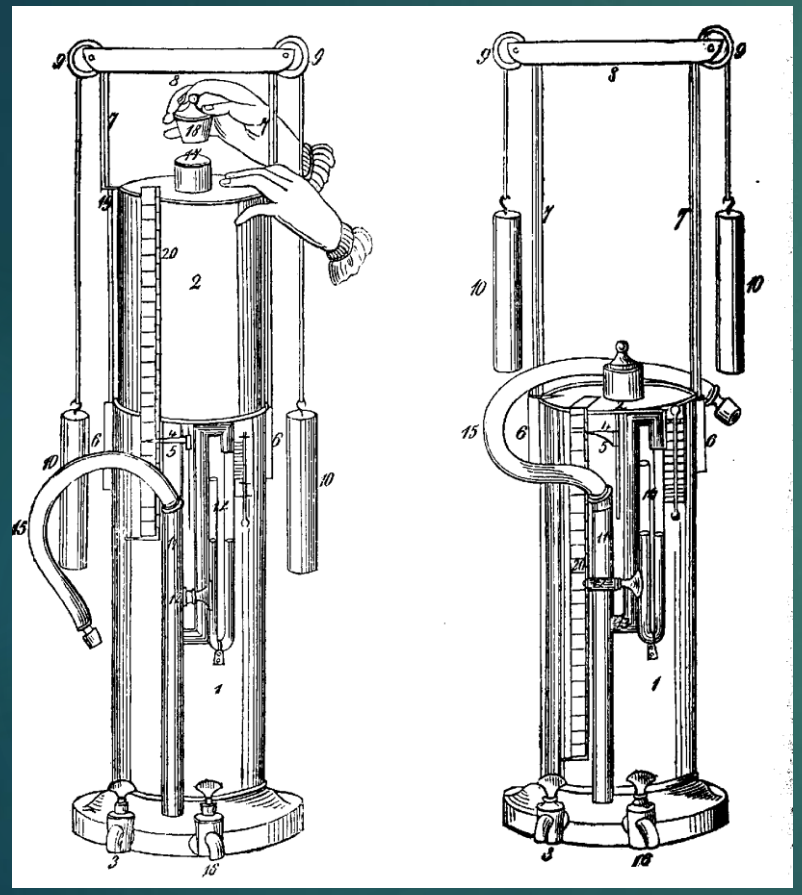
- As diagnostic tests become less expense, there may be less reliance placed on the traditional physical assessment model
- Hand held ultrasonic devices may replace the stethoscope in the future
  - In pleural disease this technology is already being used as it reduces the need for CXR or CT scan, available at the bedside, less radiation, equal to CT when diagnosing pleural disease
- Telemedicine and patient self assessment might be used to reduced costs of face to face clinical assessments and improve access
  - Rural and remote areas
  - However this technology is not progressing as fast as expected due to barriers such as deciding how this care will be reimbursed
- Electronic Apps for patient self assessment, messaging, providing advice and support, answering questions

Question 3

John Hutchinson invented the spirometry machine in 1846. Who did he test?

a. Prisoners
b. Volunteers
c. Recently deceased patients
d. a, b & c
e. b & c

Answer: e)



In 1846 John Hutchinson invented the spirometer. His device was limited in that it could only measure vital capacity.

It was a calibrated bell which was inverted in water to measure the volume of exhaled air from fully inflated lungs.

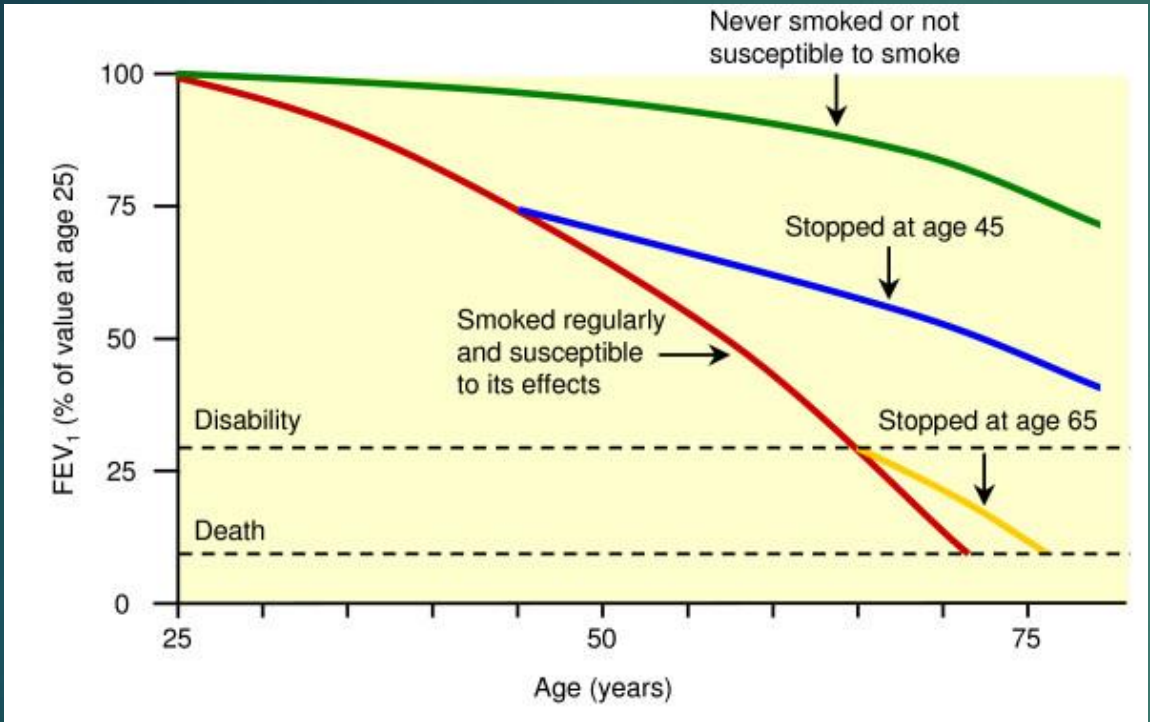
He tested both live and recently deceased patients. To test the deceased patients he would insert a tube with a stopcock into the trachea and inflate the lungs with bellows then release the stopcock to measure the amount of air expelled through the elastic recoil of the lungs giving estimate of VC.

Today – lung function testing

- The use of ‘office’ spirometry is becoming more available in primary care
- Full lung function testing remains within secondary or tertiary hospital setting
- Hand held machines to test DLCO, lung volumes and spirometry are now available

- Future challenges
  - Maintaining accurate and reliable testing
  - Having results accessible for all clinicians to see

Cigarette Smoking



Smoking became more common place during WW1 when smoking was legitimised. It was in the 1940 that lung cancer was first associated with cigarette smoking.

In 1976, Charles Fletcher, a physician who devoted his life to the study of COPD, linked smoking to COPD. Fletcher discovered that stopping smoking could help to slow the progress of COPD and that continuing to smoke would accelerate the progression of the disease.

Question 4

The first patent for an e-cigarette was issued in?

a) 1930’s
b) 1950’s
c) 1970’s
d) 1990’s

Answer: a)

- The first patent for an e-cigarette was issued in 1930 but it was never commercialised
- In 1965 another patent was issued for an e-cigarette and this one looked more like the modern e-cigarette
- It wasn’t until 1979 that the first commercial e-cigarette was used in research.
- In the 1990’s there was an increase in the number of patents granted for e-cigarettes and in 2003 the first commercially successful electronic cigarette was created China.
- In 2006 e-cigarettes where introduced into Europe and the USA.

NZ stance on e-cigarettes today

- In October 2017 the NZ MOH stated that
  - The Ministry believes e-cigarettes could disrupt inequities and contribute to Smokefree 2025
  - The evidence on e-cigarettes indicates they carry much less risk than smoking cigarettes but are not risk free

The future

- Smoking cessation and reducing exposure to the inhalation of any noxious substance will remain a core intervention in reducing the impact and prevalence of COPD
- A smoke free NZ (2025)
  - That's in 7 years
- E-cigarettes
  - Time will establish if e-cigarettes are the answer to reducing the burden of smoking or if they are a new health hazard

Question 5

Before 1960 the early treatments for COPD included antibiotics, potassium iodide and theophylline. What was the potassium iodide used for?

a) Treating thyroid disease because this was thought to be contributing to their COPD symptoms
b) As an expectorant
c) As a dietary supplement
d) Used to treat infections

- Answer: b) an expectorant

- It wasn't until the 1960's that the beta 2 agonist isoproterenol was used in the management of COPD.
- At that time oxygen was contraindicated, exercise prohibited and corticosteroids were almost never used.
- 1965 saw the development of a more systematic approach for COPD.
- One key research finding at this time was that long term oxygen therapy reduced pulmonary hypertension, erythrocytosis and improved exercise tolerance in those with chronic hypoxaemia.

Funded Inhalers in New Zealand 2016

Canterbury Clinical Network
Transforming Health Care. Whanau Ora ki Waitaha.

Short-Acting Symptom Controllers

- **Respigen** salbutamol
- **Salamol** salbutamol
- **SalAir** salbutamol
- **Ventolin** salbutamol
- **Duolin** salbutamol with ipratropium
- **Bricanyl Turbuhaler** terbutaline
- **Atrovent** ipratropium

This document has been prepared by the CCN Integrated Respiratory Service with the Canterbury Community Pharmacy Group for reference purposes only and no statement of preference is being made.

It reflects available information and policy that is current at the time it was produced. Any person accessing clinical documents must exercise their own clinical judgement on the validity and applicability of the information in the current environment and to the individual patient.

LAMA: Long-acting muscarinic antagonist.
LABA: Long-acting beta2 agonist.

- *Special Authority required*
- *Part-charge*
- *Prescription must be endorsed*

Long-Acting Symptom Controllers

- **Onbrez Breezhaler** indacaterol LABA (multiple strengths)
- **Meterol** salmeterol LABA
- **Serevent Accuhaler** salmeterol LABA
- **Serevent** salmeterol LABA
- **Oxis Turbuhaler** formoterol LABA
- **Foradil** formoterol LABA
- **Seebri Breezhaler** glycopyrronium LAMA
- **Spiriva Handihaler** tiotropium LAMA
- **Spiriva Respimat** tiotropium LAMA
- **Incruse Ellipta** umeclidinium LAMA

Combination Corticosteroid and Long-Acting Symptom Controllers

(ICS/LABA)

- **Symbicort Turbuhaler** budesonide with formoterol (multiple strengths)
- **Vannair** budesonide with formoterol (multiple strengths)
- **Breo Ellipta** fluticasone with vilanterol
- **RexAir** fluticasone with salmeterol (multiple strengths)
- **Seretide Accuhaler** fluticasone with salmeterol (multiple strengths)
- **Seretide** fluticasone with salmeterol (multiple strengths)

- **Ultibro Breezhaler** glycopyrronium with indacaterol LAMA/LABA
- **Spiolto Respimat** tiotropium with olodaterol LAMA/LABA
- **Anoro Ellipta** umeclidinium with vilanterol LAMA/LABA

Preventers

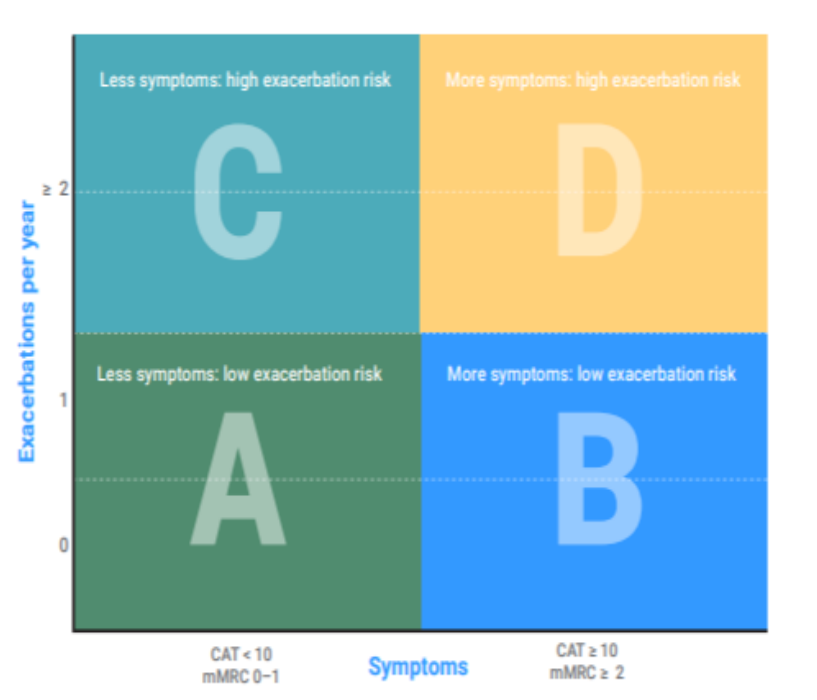
(Corticosteroids)

- **Beclazone** beclomethasone (multiple strengths)
- **QVAR** beclomethasone (multiple strengths)
- **Pulmicort Turbuhaler** budesonide (multiple strengths)
- **Floair** fluticasone (multiple strengths)
- **Flixotide Accuhaler** fluticasone (multiple strengths)
- **Flixotide** fluticasone (multiple strengths)

Preventers

(Non-corticosteroids)

- **Tilade** nedocromil
- **Intal Spin Cap/F** cromoglicate sodi (multiple strengths)



Prescribing by patient category

A — Less symptoms: low exacerbation risk

Exacerbations per year: ≤ 1 not leading to hospitalisation
mMRC: 0–1
CAT: < 10

Prescribe a **SAMA**, ***OR*** a **SABA** ***OR*** a fixed-dose combination **SAMA/SABA** for "as needed" use ***OR*** a **LAMA** ***OR*** a **LABA** for patients with COPD who have few symptoms and a low risk of exacerbations.

B — More symptoms: low exacerbation risk

Exacerbations per year: ≤ 1 not leading to hospitalisation
mMRC: ≥ 2
CAT: ≥ 10

Prescribe a **LABA** OR a **LAMA** for patients with mild to moderate COPD and persistent troublesome dyspnoea who do not have adequate symptom control using a short-acting bronchodilator.

For patients unable to achieve symptom control with a single long-acting bronchodilator or for patients with severe breathlessness consider a **combination LAMA/LABA** inhaler.

C — Less symptoms: high exacerbation risk

Exacerbations per year: ≥ 2 or 1 requiring hospitalisation
mMRC: 0–1
CAT: < 10

Prescribe a **LAMA** for patients who have few symptoms but a high risk of exacerbations.

For patients who develop further exacerbations, the preferred treatment option is a combination **LAMA/LABA** with an **ICS/LABA** as another second-line option for patients requiring treatment intensification.

D — More symptoms: high exacerbation risk

Exacerbations per year: ≥ 2 or 1 requiring hospitalisation
mMRC: ≥ 2
CAT: ≥ 10

Prescribe a combination **LAMA/LABA** for patients who have many symptoms and a high risk of exacerbations.

For patients who develop further exacerbations, escalation to **ICS/LAMA/LABA** triple therapy is the preferred treatment option with a switch to an **ICS/LABA** as another second-line option. If exacerbations persist in patients taking triple therapy, consider withdrawing the **ICS**.

The COPD prescribing tool. https://bpac.org.nz/2016/copd-tool/docs/COPDbooklet.pdf

Lifestyle recommendations

- Smoking cessation
- Pulmonary rehabilitation
- Vaccines
- Diet

- https://www.goodfellowunit.org/podcast/non-pharmacological-management-copd-fiona-horwood
- https://bpac.org.nz/2017/copd.aspx

Future treatments

- Biologics/biological response modifiers
  - Act by neutralising or modulating the function of molecular targets to have a more specific anti-inflammatory action
  - Developed for use in asthma and some other conditions
  - Trials in COPD but so far disappointing results

- Bacterial microbiome of the lungs
  - Developing area of research
  - To gain a greater understanding the role of the microbiome in the human lung
  - In order to develop treatments/interventions

Question 6

Lung volume reduction surgery (LVRS) improves life expectancy in the COPD patient.

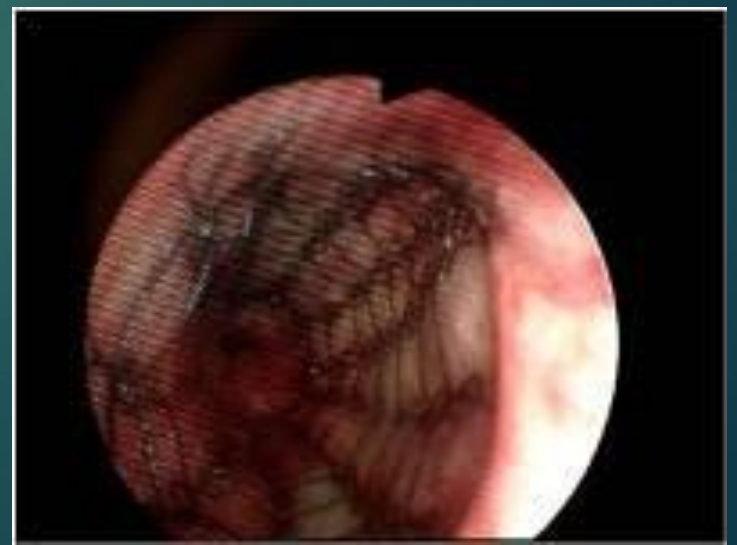
- ❑ True
- ❑ False

Answer: False

- A 2003 RCT showed no reduction in mortality but an improved quality of life after LVRS (National Emphysema Trial Group, 2003).
- However a small subset with predominantly upper lobe disease did have a small but significant survival benefit.
- LVRS was first introduced in 1957 and become more accepted in the 1990's.
- It is a surgical procedure that reduces the lung volume by removing the emphysematous tissue in the affected area. It is though to reduce the mismatch between the hyperinflated lungs and the chest cavity, increasing elastic recoil and improving expiratory airflow
- Lung transplant is available but due to the low availability of organs is not a common intervention. There is a high incidence of organ rejection and complications.

Future treatments

- Bronchoscopic lung volume reduction (BLVR)
  - are a collection of innovative non-surgical procedures to improve the disease status and lung function of those with COPD
  - If used is for those where standard treatment hasn't improved symptoms.
  - It involves endobronchial placement of one-way valves, coils, plugs, blockers and thermal ablation



Future Treatments

- A recent cochrane review found there was some evidence for short-term improvement in lung function and quality of life using endobronchial valves and endobronchial coils.
- Thermal ablation studies were small so inconclusive
- Airway bypass stents didn't make a difference
- There were potentially high rates of complications as a result of the BLVR procedures, but the Cochrane review was unable to comment on the risk of death as the studies were small and of short duration.

Van Agerten et al., 2017. Bronchoscopic lung volume reduction procedures for chronic obstructive pulmonary disease. Cochrane Library.

Summary

- COPD has been recognised for over 200 years and treatments have evolved slowly over time
- Treatment approaches continue to be refined, but there doesn't appear to be any major breakthroughs on the horizon
- The challenges ahead include
  - Personalising treatment
  - Keeping up-to date with the range of inhalers and other treatments
  - Increasing demand for health care services and maintaining appropriate health funding for this condition (urgent GP, home help, health care costs)
  - The impact antibiotic stewardship may have on this group of patients
  - Increasing demand for palliative care
  - Need for more research into novel treatments for COPD
  - E-cigarettes