

Cough and Haemoptysis

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Objectives

- Describe prevalence of cough and haemoptysis in palliative care
- Understand the management of reversible causes
- Describe pharmacological management
- Describe mechanisms of action of antitussive medications
- Be aware of the evidence base (and its limitations) for the management of cough and haemoptysis

Cough

- Rapid expulsion of air from the lungs
- Estimated speed of 100 mph
- Important physiological protective reflex
- A defense mechanism which helps clear excessive secretions and foreign material from airway
- A common symptom for which patients seek medical attention
- Pathological when:
 - Ineffective – dry or unproductive
 - It adversely affects sleep, rest, eating or social activities
 - It causes other symptoms such as muscle strain, rib fracture, vomiting, syncope, urinary incontinence¹

Cough

- ‘Cough’ of all types and duration is the single most common complaint for which patients of all ages seek medical care from primary care¹
- In the UK prevalence of chronic cough in general population is 12%²
- In 2013, US- \$6.8 billion and UK- \$156 million on OTC remedies

1. Irwin, R.S., et al., *Overview of the management of cough: CHEST Guideline and Expert Panel Report*. Chest, 2014. **146**(4): p. 885-9.
2. Ford AC, Forman D, Moayyedi P, Morice AH. Cough in the community: a cross sectional survey and the relationship to gastrointestinal symptoms. Thorax. 2006;61(11):975-979.
3. The Nielsen Company (US), LLC. Market surveys for over the counter cough and cold products [unpublished survey created for Richard S. Irwin, MD]. The Nielsen Company website. <http://www.nielsen.com/us/en.html>. Published 2013. Accessed April 15, 2013.

Mechanism of Cough Reflex

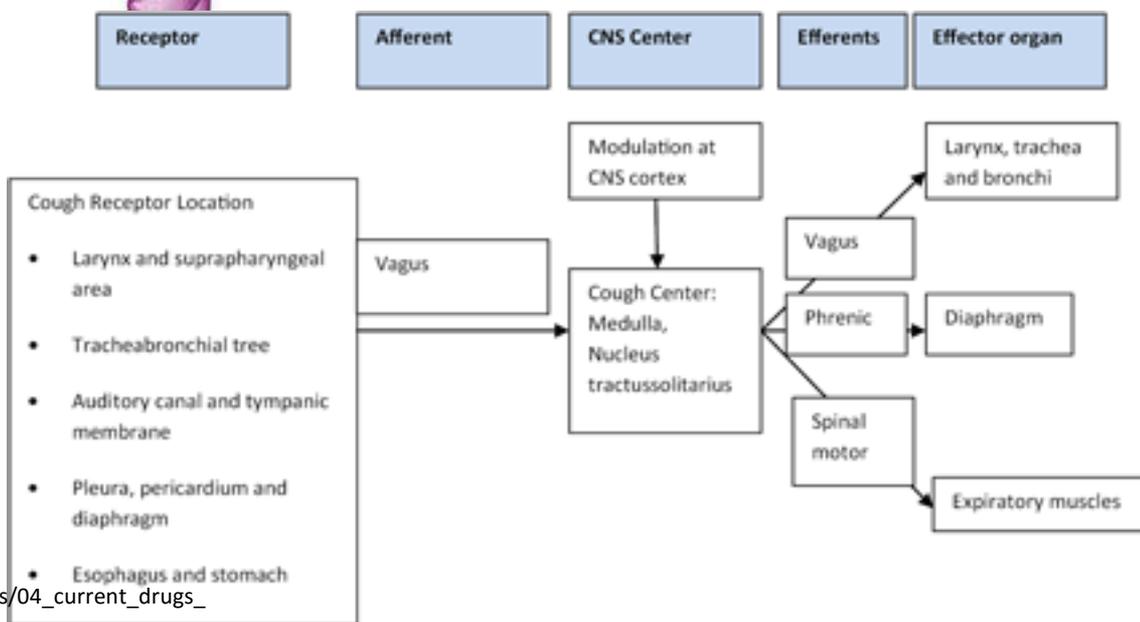
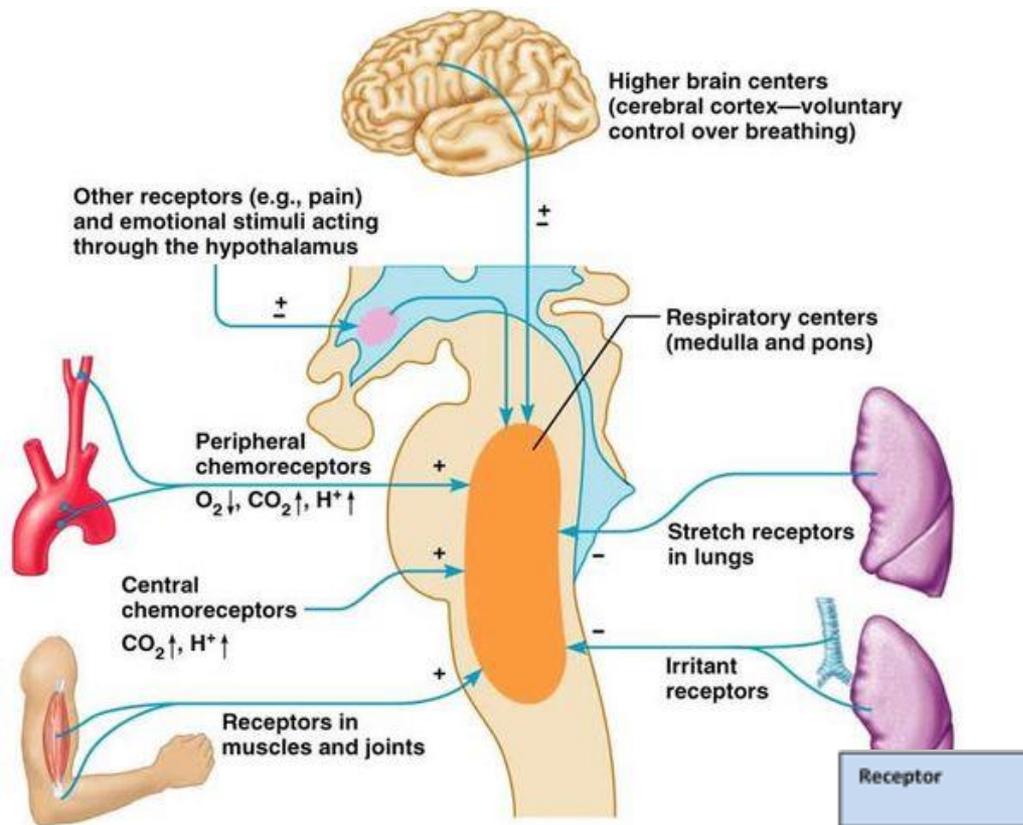
- The cough reflex has 3 components
- Receptors – located throughout airways
- Afferent sensory limb:
 - Trigeminal, Glossopharyngeal and Vagus nerves (C and Ad fibers)
 - Majority of cough receptors are served by the vagus nerve (through pharyngeal, superior laryngeal and pulmonary branches)
- Central processing center:
 - Cough centre: Located in nucleus tractus solitarius of medulla of brainstem
 - Connected to central respiratory generator
- Efferent limb
 - Vagus to the larynx and tracheobronchial tree
 - Phrenic and spinal motor nerves of C3-S2 supply intercostal muscles, abdominal wall, diaphragm and pelvic floor

Cough Reflex: Receptors

- Located throughout the airway from the pharynx to the terminal bronchioles
- Greatest concentration located in larynx, carina and bifurcation of larger bronchi
- 3 types of receptors are predominant
 - Rapidly adapting receptors (RARs) ‘cough receptors’
 - Respond to mechanical stimuli, cigarette smoke, pulmonary congestion, bronchoconstriction
 - Slowly adapting receptors (SARs)
 - Nociceptors on C-fibers
 - Respond to chemical stimuli, inflammatory and immunological mediators (histamine, bradykinin, prostaglandins, capsaicin, substance P)
- **Neuroplasticity** such that a hypersensitive response is elicited over time due to the cough itself inducing chronic irritation, inflammation and tissue remodeling.
- Similarities to neuropathic pain with
 - Paraesthesia~laryngeal paraesthesia – abnormal throat sensation/tickle
 - Hyperalgesia~ hypertussia – increased cough sensitivity to irritants
 - Allodynia ~ Allotussia- cough triggered by non-tussive stimuli – talking cold air

Cough Reflex: Medulla

- Brainstem – Medulla- Complex neural network
- Sensory input mediated by relay neurones in the nucleus of the tractus solitarius (NTS) (in dorsomedial medulla)
- Columns of neurones in the ventrolateral and dorsomedial region of medulla control cough
- Different classes of neurones, with multiple receptors, interact in these regions to control
 - Inspiratory and expiratory phase durations of cough
 - Magnitude of motor drive to spinal motoneurones
 - Activation of larynx muscle motoneurones to determine the caliber of the larynx
- Xu et al also showed deep cerebellar nuclei and the inferior olive in brainstem are involved in the production of cough
- Supra pontine processes can also control cough- humans can consciously initiate cough



Categories of Cough

- Wet (productive) or Dry (non-productive)
- Acute / Sub-acute
- Chronic – lasting more than 8 weeks
 - Subtypes categorised by cause
 - Sensory neuropathic cough (SNC)

Cough in Advanced Disease

- Chronic cough - lasting > 8 weeks
- Distressing and debilitating
- Socially disruptive, physically exhausting
- Exacerbate other symptoms – breathlessness, pain, insomnia, incontinence⁵
- Presenting symptom in 65% of lung cancer diagnoses⁶
- High rate of cough is also reported in advanced head and neck cancer
- 115 hospitalized patients with late stage nonmalignant disease- 81% had cough as a symptom⁷
- In last year of life ‘very distressing’ for
 - 22% of people with lung cancer
 - 26% with chronic lung disease⁸

5. Wee, B., et al., *Management of chronic cough in patients receiving palliative care: review of evidence and recommendations by a task group of the Association for Palliative Medicine of Great Britain and Ireland*. *Palliat Med*, 2012. **26**(6): p. 780-7.

6. Kvale PA. Chronic cough due to lung tumours. ACCP evidence-based clinical practice guidelines. *Chest*. 2006; 129 (1 Suppl): 204S-205S

7. Hung et al Potential benefits of palliative care for polysymptomatic patients with late-stage nonmalignant disease in Taiwan. *J Formos Med Assoc* 2013; 112:406

8. Edmonds P, Karlsen S, Khan S and Addington-Hall J. A comparison of the palliative care needs of patients dying from chronic respiratory diseases and lung cancer. *Palliat Med* 2001; 15:287-295

Causes of Cough in Advanced Disease

- Acute cause - infection
- Related to disease
 - Lung metastasis
 - Airway involvement
 - Pleural effusion or pleural involvement
 - SVCO
 - Paraneoplastic cough
- Related to treatment
 - Certain chemotherapies – bleomycin, methotrexate
 - Radiotherapy
 - Drugs for other conditions – ACE inhibitors
- Preexisting condition
 - Asthma, other airways disease
 - Heart failure
 - GORD

Assessment and Investigation⁹

- Assess- Impact on QOL, Severity, time of onset and duration of cough
- Pattern and character of cough
 - Dry cough, barking, short lived – reversible- pharyngitis, tracheobronchitis
 - Dry cough, persisting over weeks
 - Prolonged, low ‘bovine’ cough- left recurrent laryngeal nerve palsy (from thoracic compression) – abductor paralysis of vocal cords
 - Loose cough – secretions
 - Cough with food or after meals – aspiration
- Associated symptoms
 - Nasal discharge – cough from post-nasal drip
 - Sputum
 - Purulent/coloured – infection, Frothy sputum – LVF, Large volumes (>100mls/day) (*Bronchorrhoea*)- bronchiolo-alveolar cancer, asthma or TB
 - Haemoptysis
 - Dyspnoea – worsening effusion, lung collapse, lymphangitis

Evidence Base for Management of Cough in Advanced Disease^{10,11,12}

- Molassiotis, A., et al., *Pharmacological and non-pharmacological interventions for cough in adults with respiratory and non-respiratory diseases: A systematic review of the literature*. *Respir Med*, 2010. **104**(7): p. 934-44.
- Wee, B., et al., *Management of chronic cough in patients receiving palliative care: review of evidence and recommendations by a task group of the Association for Palliative Medicine of Great Britain and Ireland*. *Palliat Med*, 2012. **26**(6): p. 780-7.
- Molassiotis, A., et al. Interventions for cough in cancer. *Cochrane Review*.
[http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD007881.pub3/epdf\(Updated 2015\)](http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD007881.pub3/epdf(Updated%202015))

Evidence Base for Management of Cough in Advanced Disease^{10,11,12}

- Very Limited evidence
 - Small number of studies
 - Total number of participants small
 - Cough not often the primary outcome measure
 - Measurement of cough varies between studies
 - Study population heterogeneous
- Grade of evidence
 - Very few RCTs in cough and advanced illness
 - Most published data is uncontrolled studies or case reports
 - Evidence is Grade 2-4, case control, cohort studies, case reports, expert opinion
- Therefore need to also look at wider evidence
 - Systematic review Chronic Cough Yancy WS et al¹³. Efficacy and tolerability of treatments for chronic cough: a systematic review and meta-analysis. *Chest* 2013;144:1827
 - Clinical Guidelines in Use: CHEST 2016

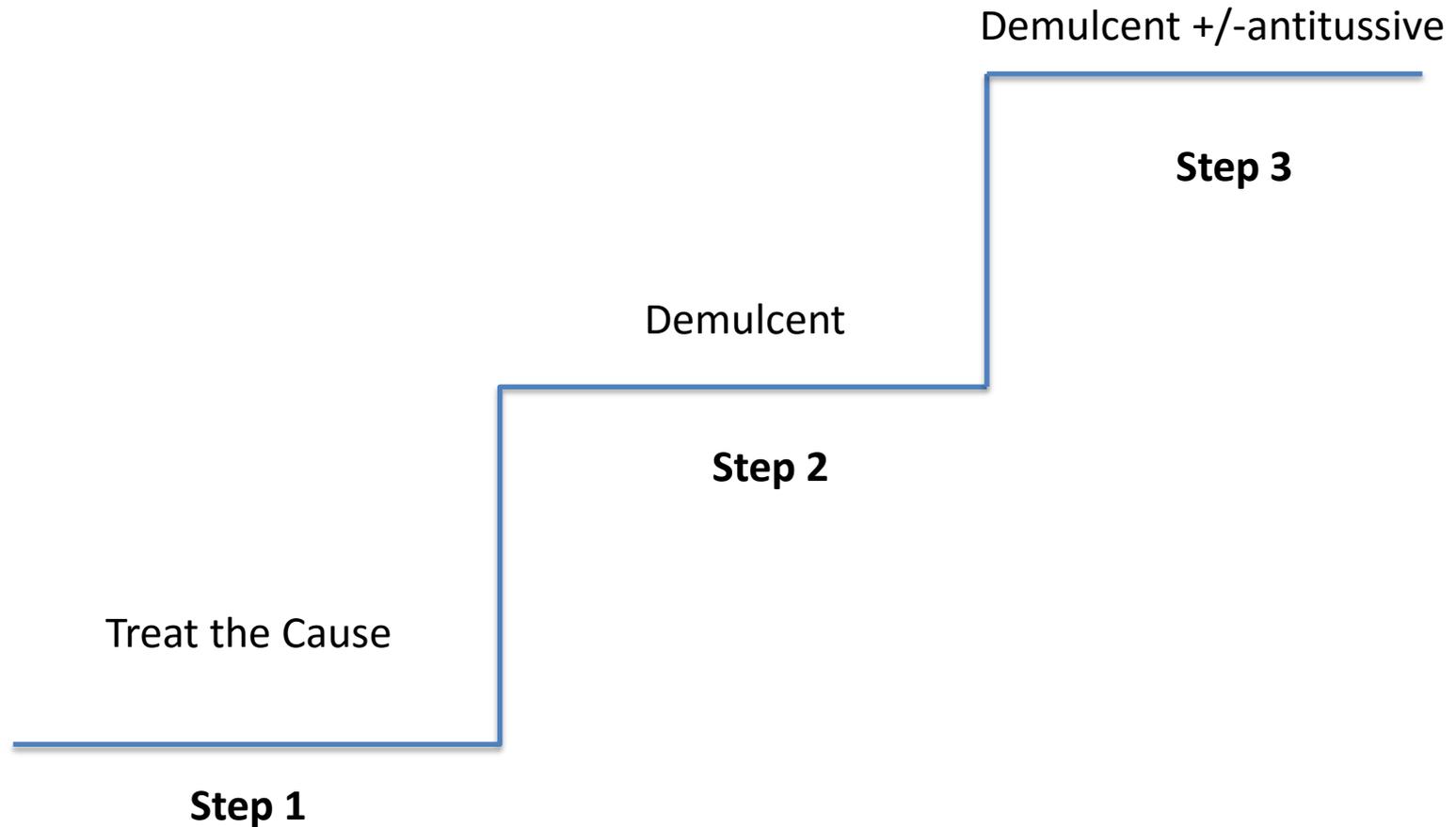
10. Molassiotis, A., et al., *Pharmacological and non-pharmacological interventions for cough in adults with respiratory and non-respiratory diseases: A systematic review of the literature*. *Respir Med*, 2010. **104**(7): p. 934-44.

11. Wee, B., et al., *Management of chronic cough in patients receiving palliative care: review of evidence and recommendations by a task group of the Association for Palliative Medicine of Great Britain and Ireland*. *Palliat Med*, 2012. **26**(6): p. 780-7.

12. Molassiotis, A., et al. Interventions for cough in cancer. *Cochrane Review*. <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD007881.pub3/epdf>(Updated 2015)

13. Yancy WS et al. Efficacy and tolerability of treatments for chronic cough: a systematic review and meta-analysis. *Chest* 2013;144:1827

Dry Cough: Management Strategy¹⁴



Dry Cough Step 1: Treat the Cause¹⁵

Nature of Cough	Possible causes	Potential Treatment
Onset related to commencing medication	ACE inhibitors	Discontinue or switch to alternative medication
Rapid onset of cough, associated with SOB	Pleural effusion Pericardial effusion PE (usually dry cough but may also have haemoptysis)	Consider drainage/pleurodesis Consider drainage Consider Ix and LMWH
Barking cough (short duration)	Pharyngitis/ Tracheobronchitis / Early pneumonia	Humidify room air Consider antibiotics
Bovine Cough	Recurrent laryngeal nerve palsy (intrathoracic compression or disease)	? Consider ENT referral for vocal cord injection
Hard brassy cough (with or without wheeze/stridor)	Tracheal compression or SVCO	Consider radiotherapy, steroids, stenting
Wheezy Cough	Airflow obstruction (Asthma/COPD)	Inhaled therapy, steroids

Step 2: Demulcent

- Demulcents
- Contain soothing substance such as syrup or glycerol
 - Simple Linctus
 - Honey
- High sugar content – stimulates production of saliva and soothes oropharynx
- ?Sweet taste antitussive by stimulating endogenous opioid release in brain stem¹⁴

- No evidence but simple and safe
- Recommended in APM and Molassiotis guidelines

- Dose Simple Linctus BP 5mls tds/qds

Step 3: Demulcent + Antitussive

- Antitussive
 - Peripheral
 - Sodium Cromoglicate
 - Nebulized local anaesthetic
 - Central
 - **Opioids and opioid derivatives**
 - Codeine, Morphine, Methadone
 - Dextromethorphan (OTC), pholcodine
 - GABA agonists
 - Gabapentin, Baclofen and Diazepam
- Preferred strategy is to use opioids
 - Most evidence and familiarity

Central Antitussive: Opioids

- Mechanism of actions
- Not fully understood, complex and unclear
- Animal studies have shown:
 - Act on opioid receptors
 - **Primarily** central action on μ receptors in the brainstem NTS
 - In addition both κ receptor agonists can inhibit cough
 - δ receptor shows conflicting responses in animal studies
 - μ receptors presynaptically inhibit excitatory glutamate postsynaptic impulses
- Opioids antagonists do not influence the cough reflex, suggesting endogenous opioids are not critical in the production of cough
- Role that different opioid receptor subtypes have in humans is unclear

Opioids Evidence Base

- Systematic review and APM recommendations in patients receiving palliative care¹¹
- 2 RCTs (small studies < 20 patients in each)
 - Matthys et al – compared dextromethorphan, codeine and placebo
 - Both significantly more effective than placebo
 - Dextromethorphan preferred
 - Sevelius et al – different doses of codeine v placebo for 4 days
 - Reduction in cough counts of between 29-67% in six hours post codeine dose
 - No dose relationship
- 2 uncontrolled studies
 - Homsy et al – reduction in cough frequency with hydrocodone in patients with advanced cancer
 - Luporini et al – significant reduction in cough severity in patients with lung ca with dihydrocodeine
- Lack of trials with morphine or head to head trials of different opioids

11. Wee, B., et al., *Management of chronic cough in patients receiving palliative care: review of evidence and recommendations by a task group of the Association for Palliative Medicine of Great Britain and Ireland*. *Palliat Med*, 2012. **26**(6): p. 780-7.

Opioid Evidence Base

- Systematic review and APM recommendations in patients receiving palliative care¹¹
- 2 other trials considered in development of recommendations
- Morice et al - RCT in a regional cough clinic
 - Patients excluded if had significant lung disease
 - 27 patients randomised to **Morphine** 5mg bd for 4 weeks or placebo
 - Morphine arm showed a significant reduction ($p < 0.01$) by 40% in daily cough scores from baseline (after 1 week)
- Smith et al – RCT cross-over study
 - 21 patients given **Codeine** 60mg or placebo in random order
 - No significant difference between codeine and placebo in cough symptom score, VAS
- Overall data on Codeine conflicting
- Recommend Morphine in preference to Codeine or other opioids

Opioids Evidence Base

- In absence of data specifically derived from palliative care populations
 - Extrapolate from patients with chronic cough from a variety of conditions
- Yancy WS et al. Efficacy and tolerability of treatments for chronic cough: a systematic review and meta-analysis. *Chest* 2013;144:1827
- Treatment of unexplained chronic cough: CHEST guideline and expert panel report confirm evidence for morphine.

Yang et al Systematic review

- 49 trials (3067 patients) comparing 68 therapeutic comparisons
- 8/11 trials comparing opioids to placebo found opioids more effective
 - Decreased cough frequency and severity
 - Improvement in QoL
 - Meta-analysis: Moderate effect size for severity and rate of cough
 - SMD cough severity 0.55 (95%CI 0.38-0.72), frequency 0.57 (95%CI 0.36-0.91)
- 4/6 trials of Dextromethorphan
 - Opioid derivative and NMDA antagonist
 - Ingredient in most OTC cough syrups
 - More effective than placebo at reducing cough severity and frequency
 - Meta-analysis: Smaller effect size compared to other opioids
- No studies comparing opioids or opioids versus protussives

Suggested Opioids and Dose

- Codeine (linctus or tablet) 15mg (5mls) tds/qds
- Morphine I/R liquid 2.5-5mg qds
- Morphine M/R formulation start at 5mg bd
- Titrate to effect or undesirable effects
- If already on opioid titrate further to suppress cough

Central Antitussive: GABA agonists

- Mechanism of action
 - Central inhibitory effects
 - May increase inhibitory neurones effects in medulla on cough reflex
 - May reduce the central sensitization and hypersensitivity in chronic cough
- Suggested GABA agonists and dose
 - Gabapentin 300mg tds increased up to 600mg tds (could start with smaller doses – 100mg bd)
 - Baclofen titrate up to 10mg tds or 20mg od
 - Diazepam 5mg PO/nocte

GABA agonist Evidence Base

- Gabapentin
- Not included in systematic review
- Ryan NM et al (2012) Gabapentin for refractory chronic cough: a randomised, double blind, placebo controlled trial. *Lancet* 380: 1583-1589
 - 62 adults with refractory chronic cough (> 8 weeks) without active respiratory disease or infection
 - Randomised to Gabapentin (up to 1800mg /day) or placebo
 - Gabapentin significantly improved cough specific QOL (p=0.004) NNT 3.58
 - Side effects occurred in 10 (31%) of the Gabapentin group (nausea and vomiting)
- Gibson et al (2015) systematic review
 - Case series and reports supporting the results of this RCT
 - Likely greatest effect in patients with central sensitisation (hypertussia, allotussia)
- Treatment of Unexplained Chronic Cough: CHEST guideline and expert panel report 2016 recommend Gabapentin

Atreya, S., G. Kumar, and S.S. Datta, *Gabapentin for Chronic Refractory Cancer Cough*. Indian J Palliat Care, 2016. **22**(1): p. 94-6.

Gibson, P.G. and A.E. Vertigan, *Gabapentin in chronic cough*. Pulm Pharmacol Ther, 2015. **35**: p. 145-8.

Gibson, P., et al., *Treatment of unexplained chronic cough: Chest guideline and expert panel report*. Chest, 2016. **149**(1): p. 27-44.

GABA agonist Evidence Base

- Baclofen
- Not included in systematic review
- Level of evidence: Case reports
 - Additional action of inhibiting relaxation of lower oesophageal sphincter and reducing reflux
 - Effective in ACEi cough

- Diazepam
- Not included in systematic review
- Level of evidence: Case reports

Dicpinigaitis, P.V., *Use of baclofen to suppress cough induced by angiotensin-converting enzyme inhibitors*. Ann Pharmacother, 1996. **30**.

Dicpinigaitis, P.V. and J.B. Dobkin, *Antitussive effect of the GABA-agonist baclofen*. Chest, 1997. **111**.

Dicpinigaitis, P.V., et al., *Inhibition of capsaicin-induced cough by the gamma-aminobutyric acid agonist baclofen*. J Clin Pharmacol, 1998. **38**.

Dicpinigaitis, P.V. and K. Rauf, *Treatment of chronic, refractory cough with baclofen*. Respiration, 1998. **65**.

Estfan, B. and D. Walsh, *The cough from hell: diazepam for intractable cough in a patient with renal cell carcinoma*. J Pain Symptom Manage, 2008. **36**(5): p. 553-8.

Peripheral Antitussives

- Suppresses peripheral transmission of afferent vagal impulses in cough reflex
- Sodium Cromoglicate
 - Suppresses peripheral C-fibers transmission of afferent vagal impulses in cough reflex
 - Dose: 10mg inhaled qds¹
 - Small RCT (n=20), lung cancer patients
 - Sodium cromoglicate versus placebo
 - Improved cough severity after 36-48hrs
- Nebulised local anaesthetic
 - Likely inhibit sensory nerves in airways
 - 5ml 2% lidocaine or 0.25% bupivacaine nebulised tds
 - No RCT data
 - Case series data – showed 20% of participants reported improved cough, many side effects including bronchospasm
 - **USE ONLY WHEN OTHER ANTITUSSIVES HAVE FAILED**

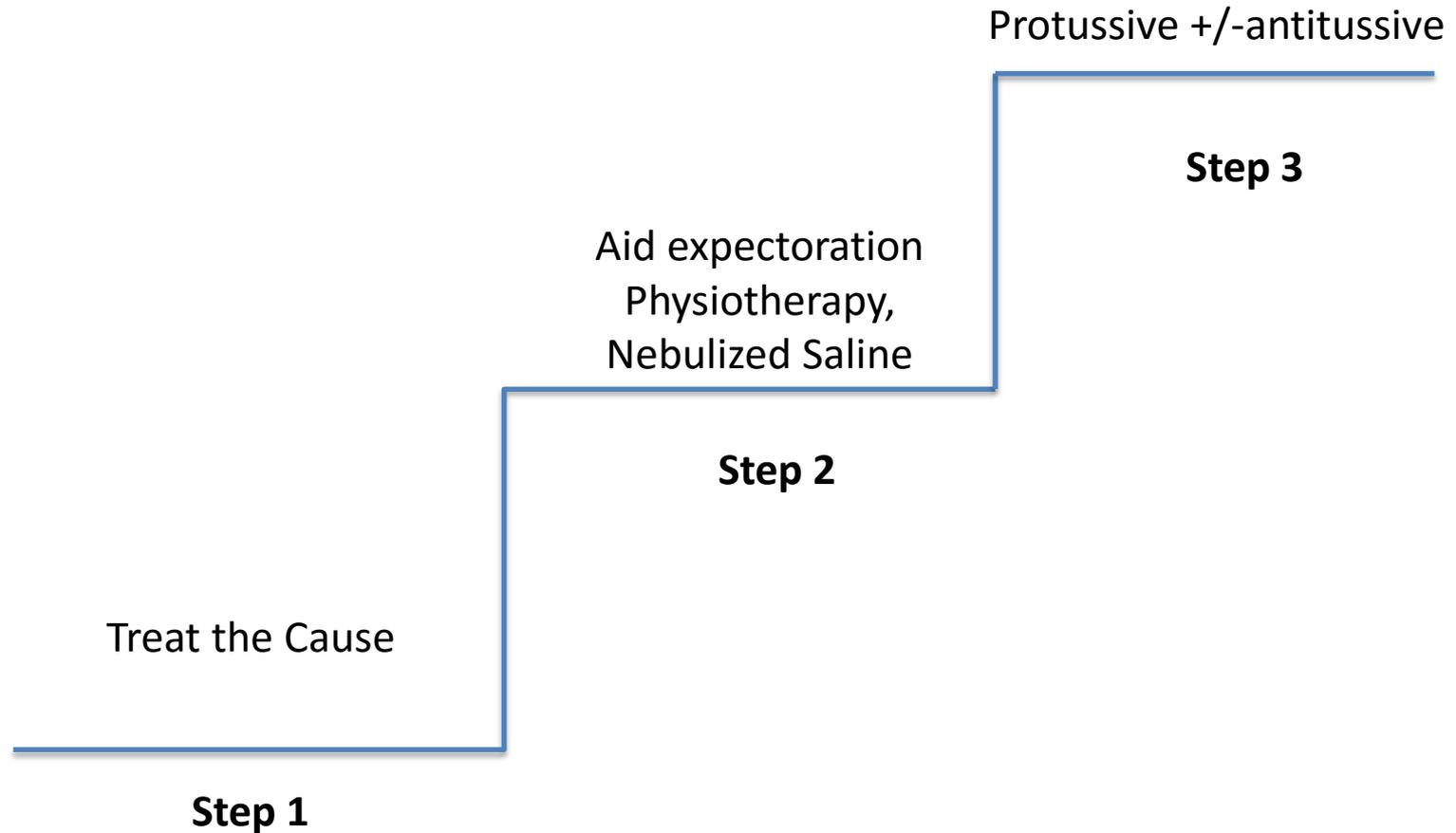
Moroni, M., et al., *Inhaled sodium cromoglycate to treat cough in advanced lung cancer patients*. Br J Cancer, 1996. **74**(2): p. 309-11.

Truesdale K et al *Nebulised lidocaine in the treatment of intractable cough*. *American journal of Hospital Palliative Care* 2013p 587-589

Disease specific and Experimental

- Thalidomide and cough in IPD
- Horton MR et al (2012) Thalidomide for the treatment of cough from idiopathic pulmonary fibrosis: a randomized trial. *Annals of Internal Medicine*. 157: 398-406
 - Double blind cross-over study n= 24
 - Cough QOL scores significantly improved with thalidomide (MD -11.4 (95%CI -15.7 to -7.0) p<0.001)
 - 74% of patients receiving thalidomide had side effects

Wet Cough: Strategy for management¹⁴



Wet Cough Step 1: Treat the cause

Nature of Cough	Possible cause	Potential treatment
Productive	COPD (no infection)	Optimise inhaled therapy, consider steroids Antibiotics (?PO/IV)
	Infection, pneumonia	Antibiotics (?PO/IV) and steroids
	COPD exacerbation	Consider ? Possible stenting
	Tracheo-oesophageal fistula	Antimuscarinics /anticholinergics, antibiotics PPI, prokinetic
	Aspiration of saliva	Optimise medical management
	Gastro-oesophageal reflux	
	Cardiac failure	
After food	Fatigue or weakness causing a poor swallow	SALT assessment
Weak ineffective	MND, Amyotrophic lateral sclerosis	Consider antisecretory (e.g Hyoscine) Titrate carefully Consider suction or cough assist machine

Step 2 & Step 3

- Step 2: Aid Expectoration
 - Physiotherapy
 - Nebulized Saline
- Step 3: Protussive
- Chemical mucolytics
 - Reduce viscosity of bronchial secretions by breaking links between mucin polymers
 - Anti-inflammatory effect
 - Suggests drugs and dose
 - Carbocisteine – start 750mg tds, reduce to bd once satisfactory response occurs
 - Erdosteine – 300mg bd for up to 10 days (in COPD)
 - ? N-acetylcysteine

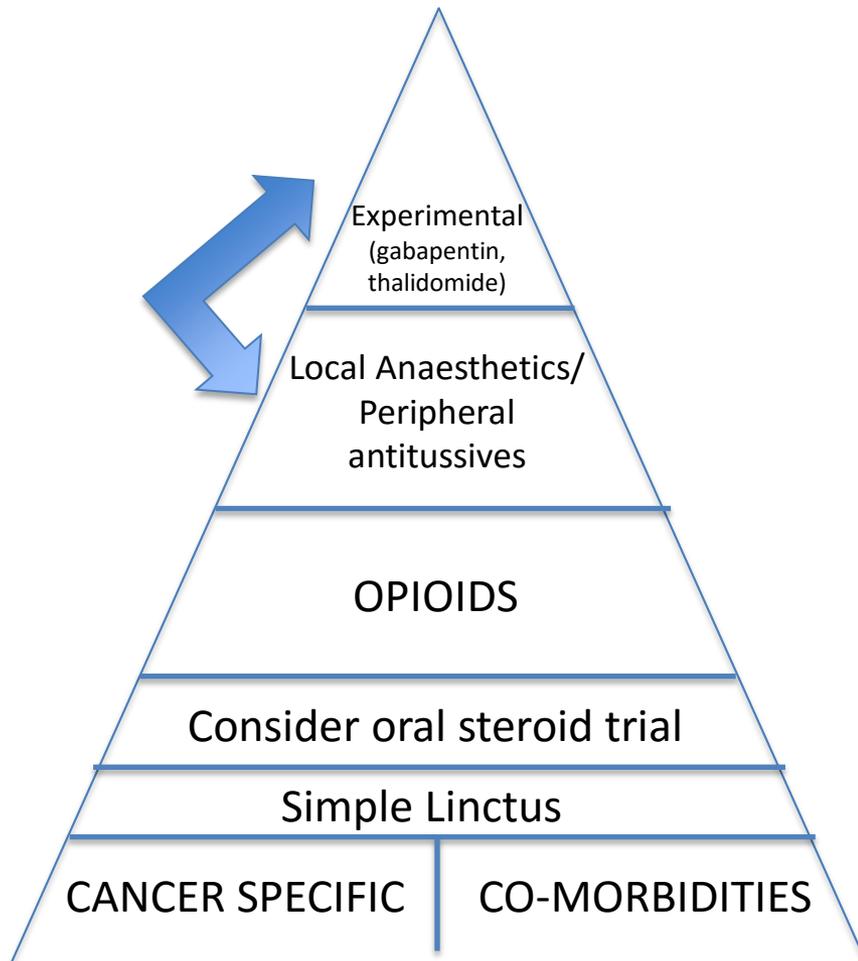
Disease specific and Experimental

- Systematic Review for treatment of Bronchoalveolar Ca
- 48 studies identified, 20 eligible for review
- No controlled trials
- All 20 case reports and case series
- Treatments with reported effect on symptoms were: Corticosteroids, macrolide antibiotics, indomethacin, octreotide

Evidence Base for Management of Cough in Cancer

- Molassiotis, A., et al., *Pharmacological and non-pharmacological interventions for cough in adults with respiratory and non-respiratory diseases: A systematic review of the literature*. *Respir Med*, 2010. **104**(7): p. 934-44.
- Molassiotis A et al. Clinical expert guidelines for the management of cough in lung cancer: report of a UK task group on cough. *Cough* 2010. **6**: 9

Molassiotis et al recommendations¹⁰,



- For lung cancer
- Combination of synthesis of 2 systematic reviews and expert panel
- Higher up the pyramid – less evidence and less confidence in recommendation

10. Molassiotis, A., et al., *Pharmacological and non-pharmacological interventions for cough in adults with respiratory and non-respiratory diseases: A systematic review of the literature*. *Respir Med*, 2010. **104**(7): p. 934-44.

Molassiotis A et al. Clinical expert guidelines for the management of cough in lung cancer: report of a UK task group on cough. *Cough* 2010. **6**: 9

Evidence Base for Management of Cough in Advanced Disease¹¹

- Wee, B., et al., *Management of chronic cough in patients receiving palliative care: review of evidence and recommendations by a task group of the Association for Palliative Medicine of Great Britain and Ireland*. *Palliat Med*, 2012. **26**(6): p. 780-7.
 - 60 studies, 11 full text assessed for eligibility
 - 6 excluded as only case reports, small series
 - 5 included in recommendations (only 3 RCTs) with 2 additional studies considered (2 RCTs)
- Limited evidence in both quantity and quality to support robust guidelines.
- Recommendations are also based on convenience, minimising burden and harm and toxicity

APM recommendations¹¹

Recommendations (Grade D)

1. Consider potential for disease-directed treatment
2. Review medications and consider if appropriate to discontinue those that exacerbate cough (ACEi)
3. Consider co-existing benign causes of chronic cough (Asthma, GORD) and treat
4. Prescribe simple linctus: a demulcent cough preparation (no evidence but safe)
5. Therapeutic trial of sodium cromoglycate inhaler (one small RCT, relatively safe)
6. Prescribe an opioid or opioid derivative:
 - a. Dextromethorphan: weak evidence, low toxicity
 - b. Morphine: most recent evidence suggests significant benefit over placebo. 5mg MR BD, unless already on morphine and then titrate upwards
 - c. Codeine: conflicting evidence – historical evidence is weak, most recent evidence shows no benefit. Probably should not choose codeine over morphine
 - d. ? Trial a GABA agonist - Gabapentin

11. Wee, B., et al., *Management of chronic cough in patients receiving palliative care: review of evidence and recommendations by a task group of the Association for Palliative Medicine of Great Britain and Ireland*. *Palliat Med*, 2012. **26**(6): p. 780-7.

Evidence Base for Management of Cough in Cancer¹²

- Molassiotis, A., et al. Interventions for cough in cancer. Cochrane Review (Updated 2015)¹²
- This review did not identify any additional trials to the original version in 2010
- Shows overall ‘almost complete absence of any credible evidence on the management of cough in cancer patients’

Haemoptysis – Definition, incidence

- Expectoration of blood that originates from the lower respiratory tract (lung parenchyma or airway)
- Most is self-limiting, but in 5%-15% it may be severe or massive (MH)
 - life threatening requiring urgent investigation and treatment
 - Mortality of MH is 50%
- Massive haemoptysis
 - no agreed volume definition (100-1000mls) - > 200mls
 - Associated with haemodynamic instability
- Asphyxia – due to flooded airway- is usually the cause of death

Causes – Differential Diagnosis

Parenchymal source	Vascular source	Airway source
TB	AV malformation	Cancer
Pneumonia	PE	Bronchitis
Lung Abscess / Mycetoma	Pulmonary artery rupture	Broncholithiasis
Lung contusion		Airway trauma
Small vessel vasculitis		Foreign Body
	Pseudo-haemoptysis	Others
	Upper airway or GI source	Coagulopathy/ thrombolytic agents

Assessment

- **Indications for admission / urgent management**
- Etiology with high risk of repeat/massive bleeding (pulmonary artery involvement)
- Breathing difficulties
 - RR > 30, Sats 88% RA or need for high flow oxygen
- Haemodynamic instability
 - Hb < 80 or a drop of > 20, , hypotension, coagulopathy
- Massive haemoptysis
 - >200mls or less in lung disease
- Other comorbidities

Predictors of in-hospital mortality

Predictor	Score
CXR shows involvement of 2 or more quadrants	1
Chronic alcoholism	1
Pulmonary artery involvement	1
Aspergillosis	2
Malignancy	2
Mechanical ventilation required	2

Score	0	1	2	3	4	5	6	7
Mortality	1%	2%	6%	16%	34%	58%	79%	91%

Adapted from Fortoukh M et al. Early prediction of in-hospital mortality of patients with haemoptysis: an approach to defining severe haemoptysis. *Respiration* 2012; 83 (2) 111

Earwood J, Thompson T Haemoptysis: Evaluation and Management. *American Academy of Family Physicians*. 2015 91 (4) 243

Active Management

- Aim: stabilise and reverse haemoptysis
 - Admit, consider ITU
 - ABC
 - Hb, platelets, coagulation, G&S, Xmatch, CXR
 - Place patient in lateral decubitus position with the affected lung down
 - to prevent pooling of blood in unaffected bronchial tree
 - Reverse abnormal clotting, haemodynamic support
 - Treat cause
 - IV Terlipressin
 - Bronchoscopy/ CT angiography and/or arteriography with embolisation
 - Long term: Oral tranexamic acid, ? Oral Atenolol

Palliative management

- Paucity of evidence
- Case series or expert opinion
- Tranexamic acid
 - 1 pilot study with 3 patients (1997). All 3 experienced cessation of bleeding within 1-4 days
 - Dosing 1.5g initially, 1g tds
- Etamsylate
 - Expert opinion – 500mg qds
- Corticosteroids
 - Expert opinion and anecdotal evidence, no optimal dose
- Pressins – vasoconstrictors
 - IV terlipressin 1 case series in 20 patients severe haemoptysis
 - 14/20 'total success', 5/20 'partial success'
 - Case series n=2 of nebulised Vasopressin (2005)
 - Initial improvement and then rebleed
- Is this a terminal catastrophic bleed?
 - Stay with the patient, consider sedation if time allows

http://www.palliativedrugs.com/download/090331_Final_bleeding_guideline.pdf

<http://www.rlbuht.nhs.uk/Education%20and%20Learning/Documents/Emergency%20Medicine%20App%20-%20other%20PDFs/Major%20haemorrhage%20guidelines%20word.pdf>

Objectives

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- Be aware of the evidence base (and its limitations) for the management of cough and haemoptysis