Βρογχεκτασίες στο άσθμα: τι αλλάζει στη διάγνωση και αντιμετώπιση

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Αθήνα 13 Δεκεμβρίου 2019

Δήλωση σύγκρουσης συμφερόντων

- Δεν έχω για την παρούσα ομιλία

Εισαγωγή

- Οι Βρογχεκτασίες συχνά συνυπάρχουν με ΧΑΠ και σοβαρό άσθμα.
- Αυξημένη φλεγμονή των αεραγωγών, συχνές παροξύνσεις , βαρύτερη απόφραξη αεραγωγών,χειρότερη ποιότητα ζωής και αυξημένη θνητότητα.
- Ασθενείς με τα τρία ανωτέρω νοσήματα αεραγωγών μπορεί να έχουν επι πλέον παραρινοκολπίτιδα και νόσο ανωτέρων αεραγωγών
- Αποτέλεσμα:

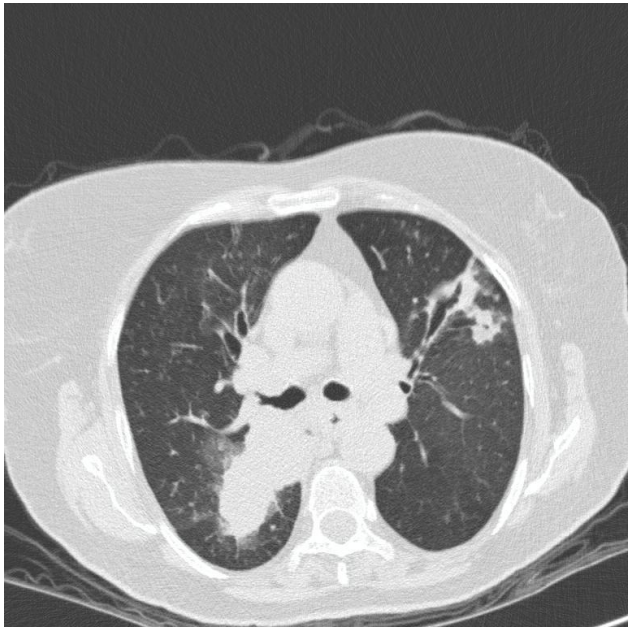
‘’πολύπλοκος μικτός φαινότυπος νοσημάτων αεραγωγών’’

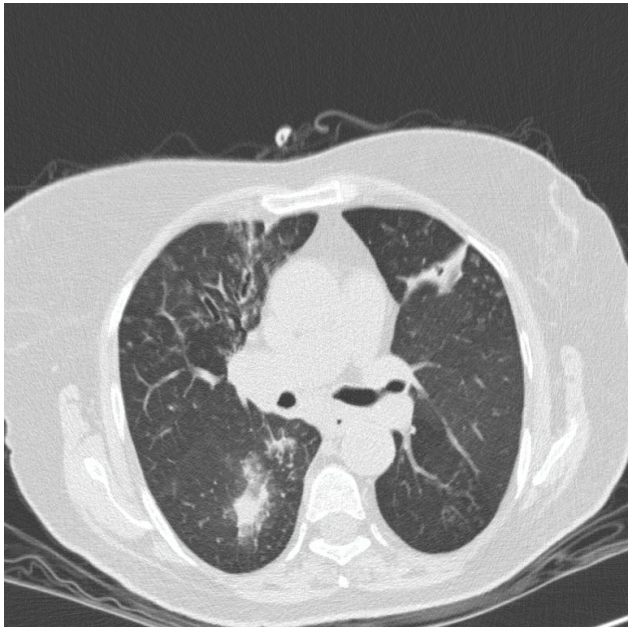
Polverino E et al Eur Respir J 2018; 52: 1800328

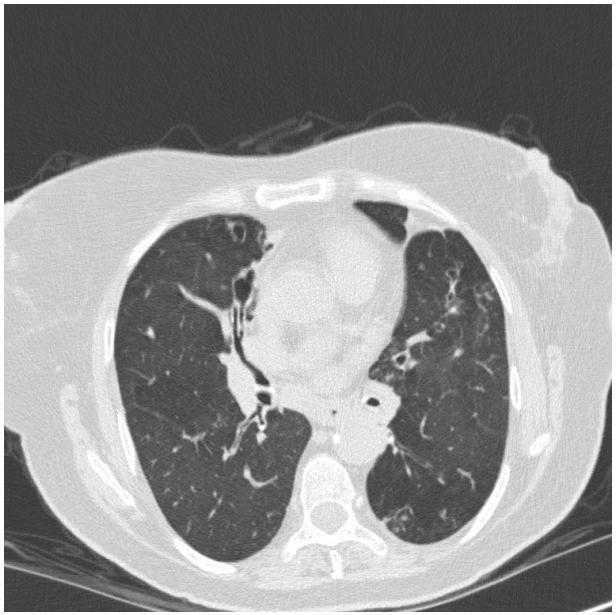
Ασθενής 65 ετών, μη καπνίστρια

- Βρογχικό άσθμα από ετών
- Τρείς παροξύνσεις/ έτος
- Συχνή λήψη στεροειδών
- IgE 2000, Eos 540
- ABPA
- FEV1: 0.8 L (44%)
- Βρογχεκτασίες
- Χρόνια λοίμωξη από ψευδομονάδα

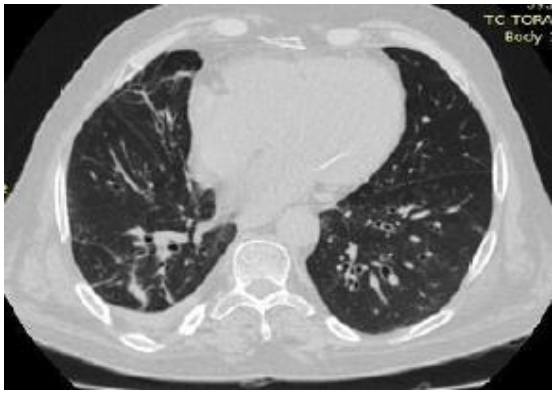
- *Τι θεραπευτική αγωγή θα πάρει;*







Βρογχεκτασίες και άσθμα



- Διαφοροδιάγνωση;
- Συνύπαρξη-συν-νοσηρότητα;
- Διαφορετικός φαινότυπος;
- Αιτιολογική σχέση;
- Αλληλοεπικάλυψη;

- Παθογενετικοί μηχανισμοί;

- Σημασία για την βαρύτητα- έκβαση;
- Σημασία για την αντιμετώπιση;

ERS Monograph 2019

ERS Research Seminar

The interaction between airways disease and bronchiectasis

- An initiative of the EMBARC and SHARP CRCs

07th- 08th February 2019

Barcelona, Spain

Organisers : *Prof. James D Chalmers and Prof. Ratko Djukanovic*

EMBARC: *Πανευρωπαϊκή μελέτη καταγραφής Βρογχεκτασιών:*

Μελετάται χωριστά η ομάδα Βρογχεκτασιών - άσθματος

Θέματα

- Σχέση άσθματος- βρογχεκτασιών
- Το άσθμα ως αίτιο βρογχεκτασιών
- Βρογχεκτασίες στο άσθμα
- Παθογόνα στο άσθμα
- Τι αλλάζει στη διάγνωση και αντιμετώπιση

Ορισμός σοβαρού άσθματος

When a diagnosis of asthma is confirmed and comorbidities have been addressed, severe asthma is defined as "asthma which requires treatment with high dose inhaled corticosteroids (ICS) (see table 4 for doses in adults and children) plus a second controller (and/or systemic corticosteroids) to prevent it from becoming 'uncontrolled' or which remains 'uncontrolled' despite this therapy."

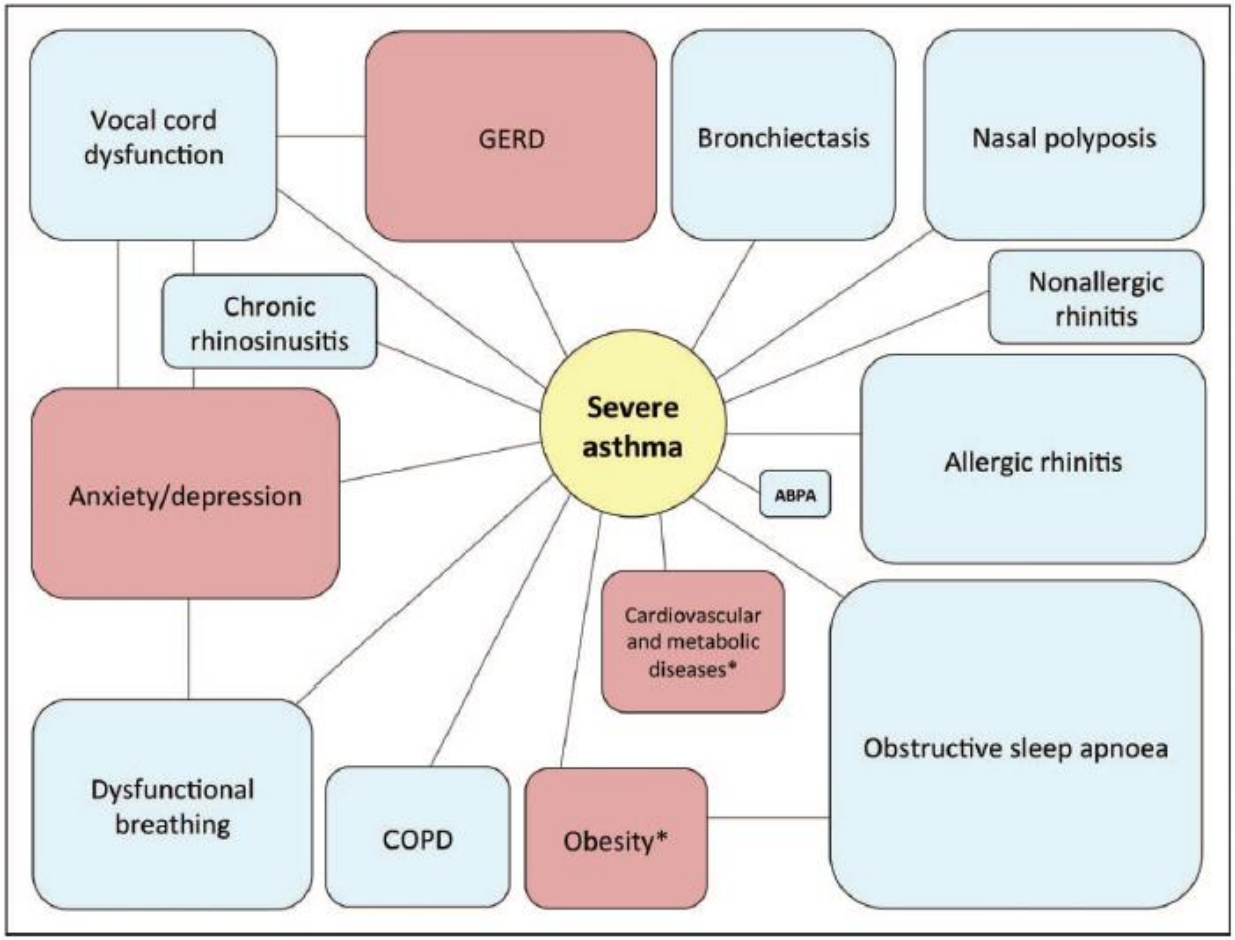
ERS/ATS Guidelines

Diseases which can masquerade as severe asthma

- Dysfunctional breathlessness/vocal cord dysfunction
- Chronic obstructive pulmonary disease
- Hyperventilation with panic attacks
- Bronchiolitis obliterans
- Congestive heart failure
- Adverse drug reaction (e.g. angiotensin-converting enzyme inhibitors)
- **Bronchiectasis/** cystic fibrosis
- Hypersensitivity pneumonitis
- Hypereosinophilic syndromes
- Pulmonary embolus
- Herpetic tracheobronchitis
- Endobronchial lesion/foreign body (e.g. amyloid, carcinoid, tracheal stricture)
- Allergic bronchopulmonary aspergillosis
- Acquired tracheobronchomalacia
- Churg–Strauss syndrome

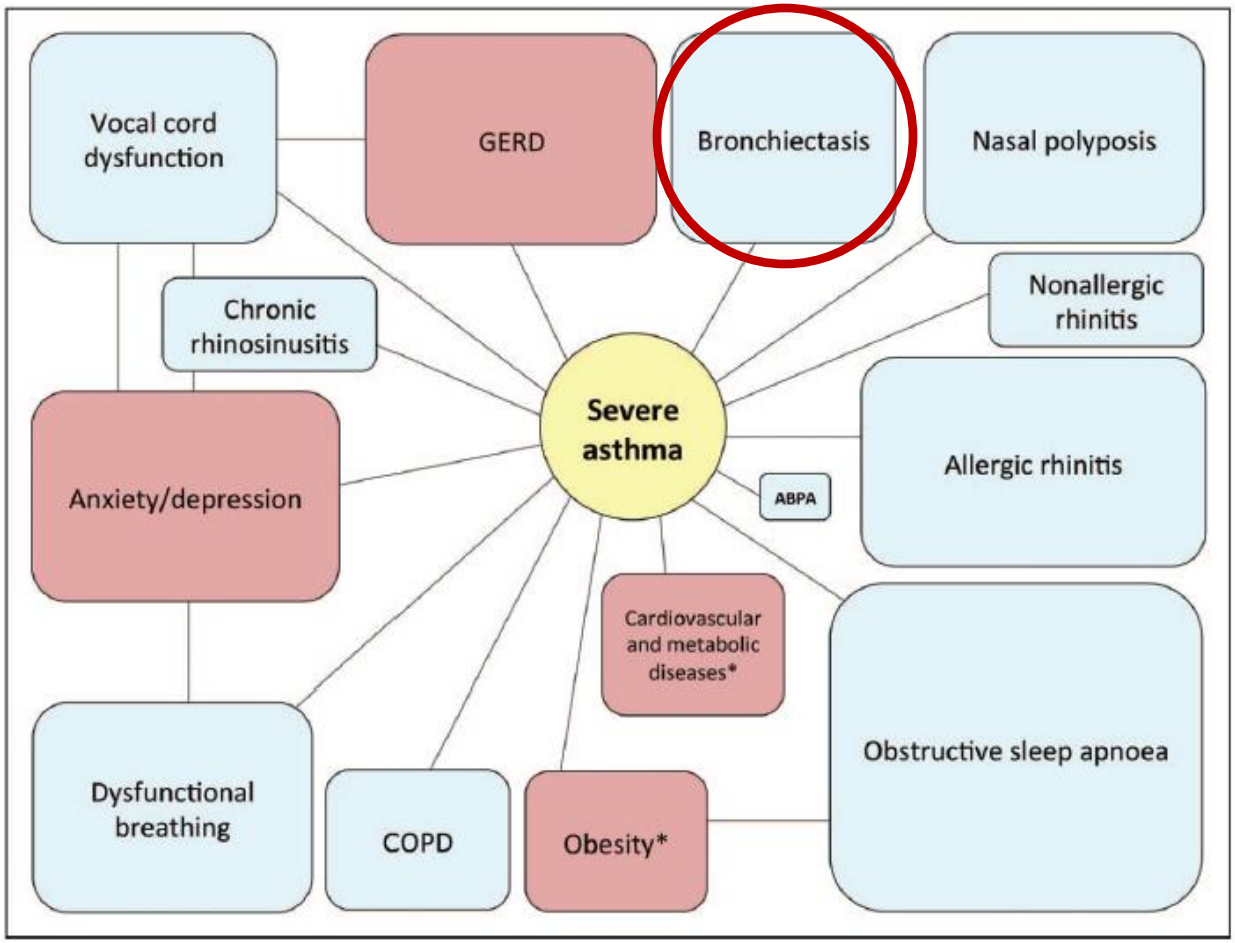
ERS/ATS Guidelines

Συν-νοσηρότητες σε σοβαρό άσθμα



Rogliani P et al.Curr Opin Pulm Med 2020, 26:47–55

Συν-νοσηρότητες σε σοβαρό άσθμα



Rogliani P et al.Curr Opin Pulm Med 2020, 26:47–55

Conditions Associated With Bronchiectasis

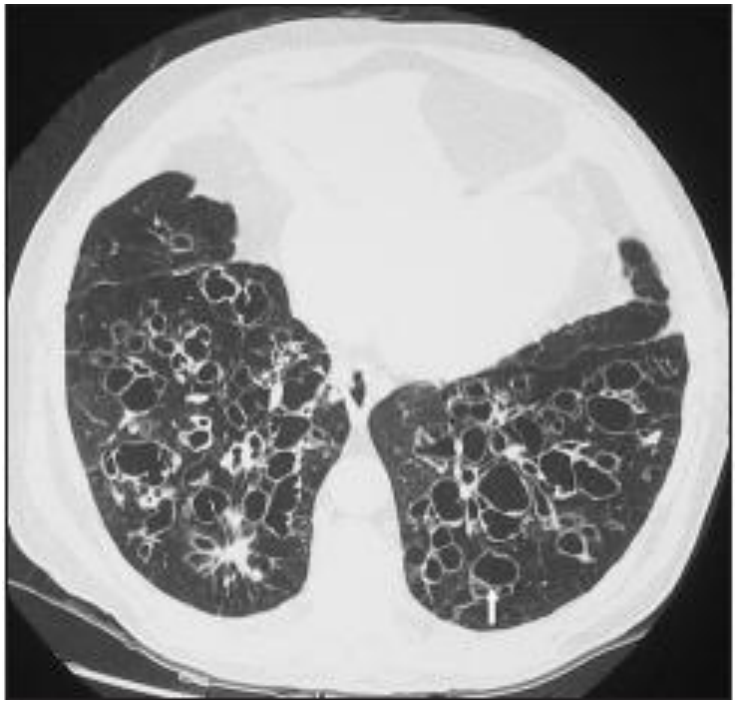
Category	Condition
Infectious	Postinfectious: Severe pneumonia, pertussis, TB
	Chronic NTM infection
	Viral
	Bacterial
	Fungal
Anatomic (focal bronchiectasis)	Foreign body
	Right middle lobe syndrome (extrinsic compression from postinfectious adenopathy)
	Postsurgical displacement
Postinflammatory pneumonitis	Chronic aspiration/gastroesophageal reflux disorder
	Chronic sinusitis
	Inhalational injury
Genetic	Cystic fibrosis
	Primary ciliary dyskinesia
	α_1-Antitrypsin deficiency
Connective tissue disease	Rheumatoid arthritis
	Sjögren syndrome
Pulmonary disease	COPD
	Bronchomalacia
	Diffuse panbronchiolitis
	Asthma
	Idiopathic pulmonary fibrosis (traction bronchiectasis)
Altered immune response	Allergic bronchopulmonary aspergillosis
	Hypersensitivity pneumonitis
Immunodeficiency	Hypogammaglobulinemia
	Chronic granulomatous disease
Congenital	Mounier-Kuhn syndrome
Other	Inflammatory bowel disease
Idiopathic	

Παθογενετικοί μηχανισμοί : δεν είναι πλήρως γνωστοί

???

Ασθμα ⟶ Βρογχεκτασίες

Βρογχεκτασίες+ Άσθμα



Μηχανισμοί σχέσης άσθματος- βρογχεκτασιών

Δεν είναι πλήρως γνωστοί

Άσθμα: Καταστροφή του τοιχώματος των βρόγχων απο τη φλεγμονώδη διεργασία λόγω συχνών παροξύνσεων

Βρογχεκτασίες- μειωμένη βλεννοκροσσωτή κάθαρση- αύξηση των εκκρίσεων–απόφραξη αεραγωγών- παρόξυνση υποκειμένου άσθματος

- Excess MMPs have been associated with destruction or dilatation of airways in patients with asthma and bronchiectasis.

- *A.M. Vignola, Eur Respir J 2004; 24: 910–917*

Airway remodelling assessed by sputum and high-resolution computed tomography in asthma and COPD

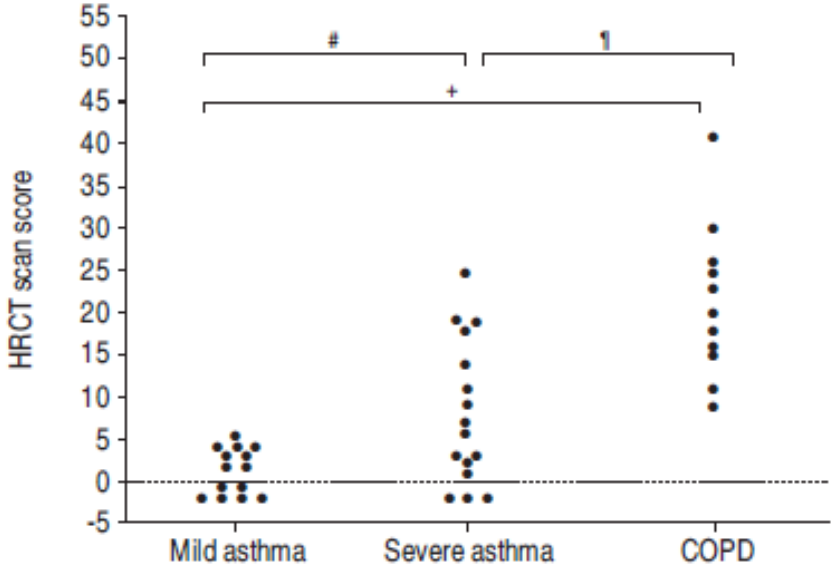
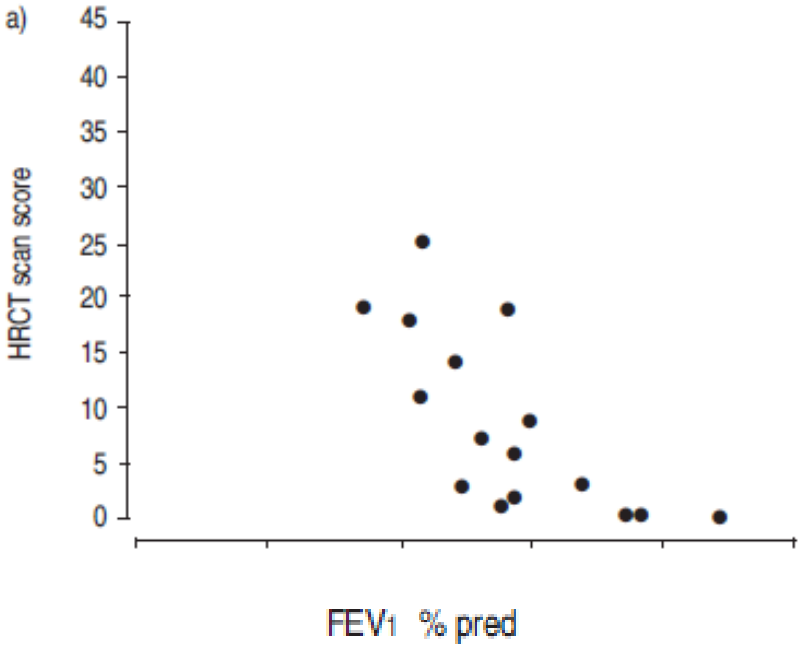


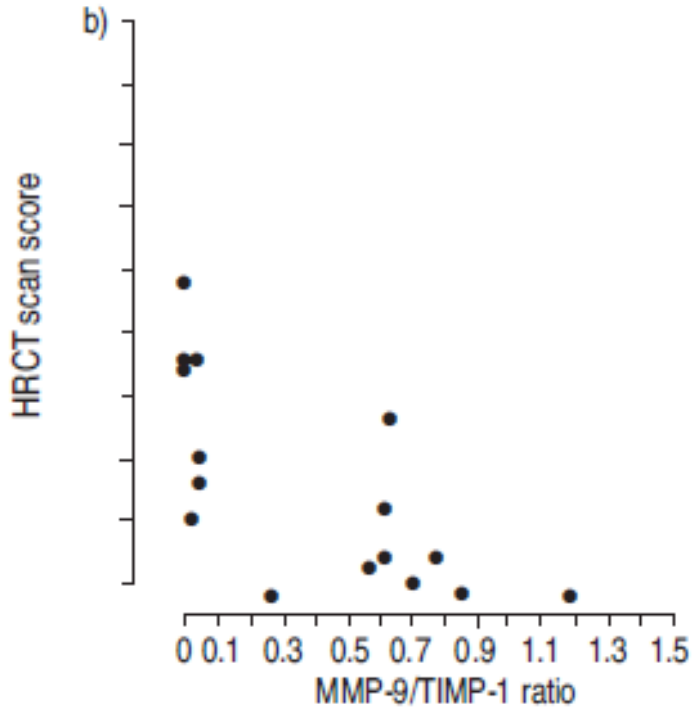
Fig. 1.–Quantification of high-resolution computed tomography (HRCT) scan score in mild asthma, severe asthma and chronic obstructive pulmonary disease (COPD). Statistical analysis was performed using the Mann-Whitney U-test. #: p<0.03; ¶: p<0.003; +: p<0.0001.

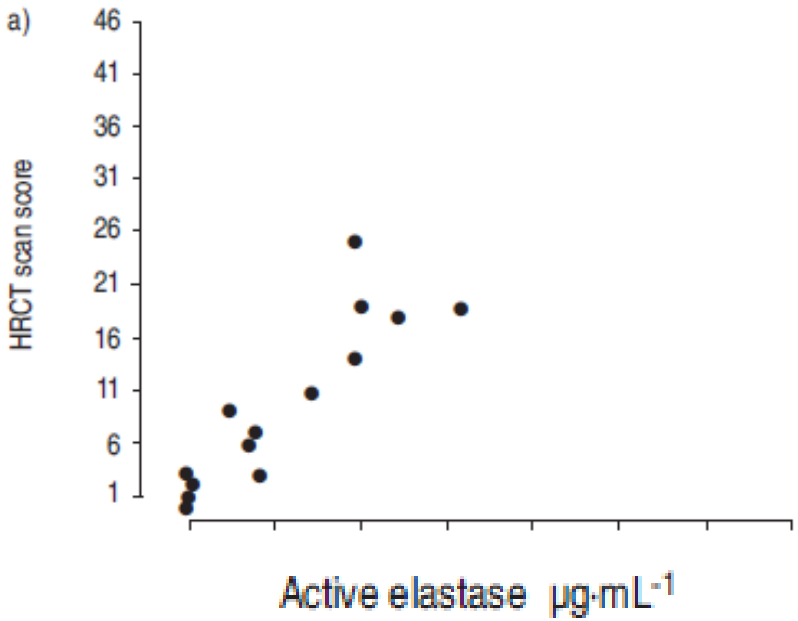
Σοβαρό άσθμα



A.M. Vignola, Eur Respir J 2004; 24: 910–917.

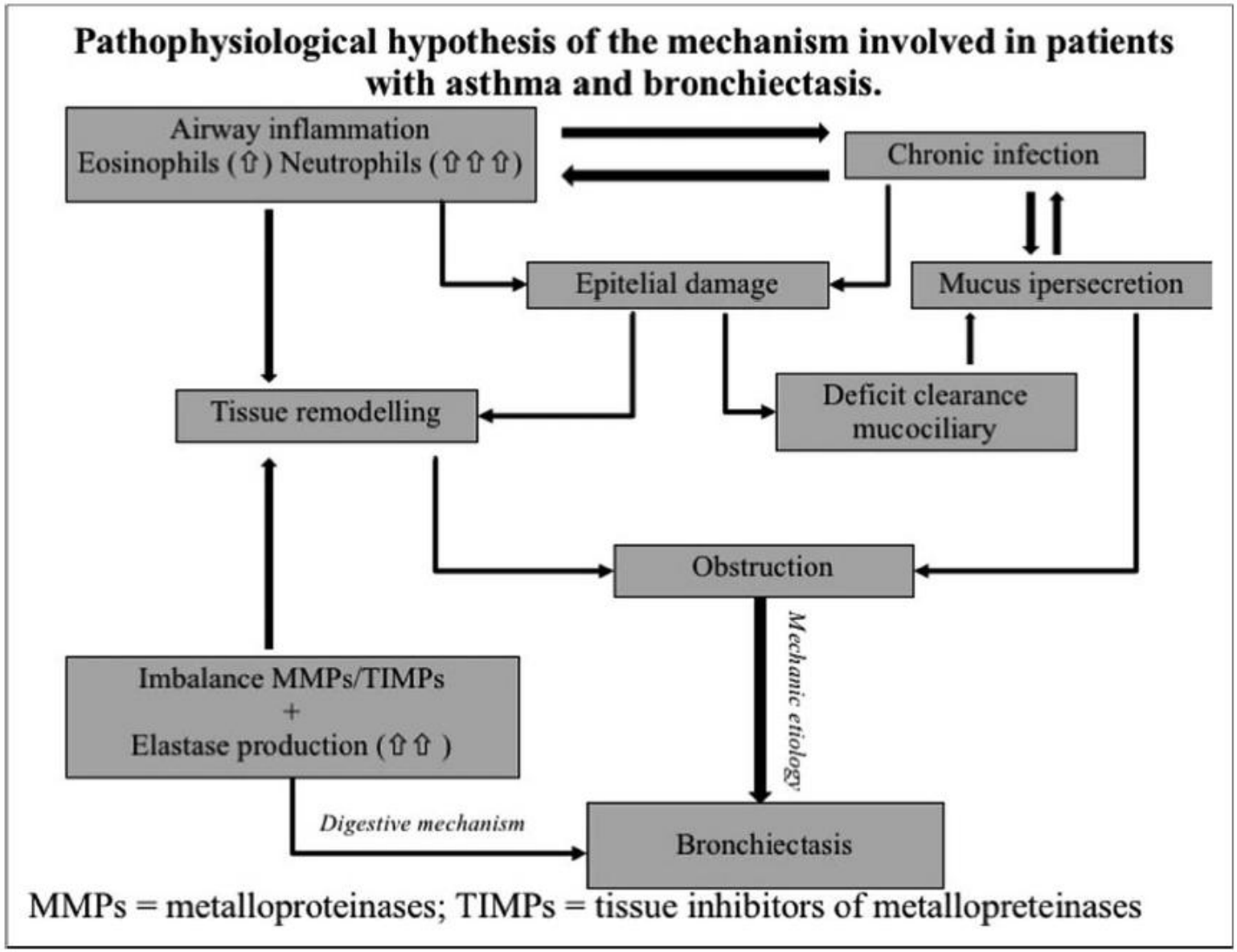
Σοβαρό άσθμα:Σχέση HRCT- δεικτών remodeling





A.M. Vignola, Eur Respir J 2004; 24: 910–917

Άσθμα και Βρογχεκτασίες: Υπόθεση παθογενετικών μηχανισμών

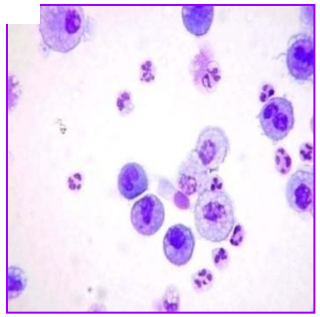


Curr Opin Allergy Clin Immunol 2019, 19:46–52

The role of non-invasive modalities for assessing inflammation in patients with non-cystic fibrosis bronchiectasis

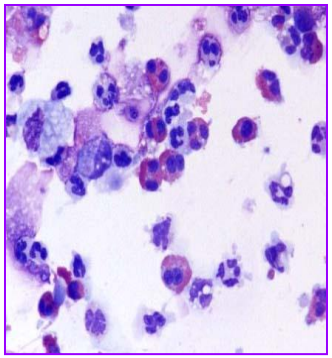
Stamatoula Tsikrika[a], Katerina Dimakou[b], Andriana I. Papaioannou[c], Georgios Hillas[d], Loukas Thanos[e], Kostantinos Kostikas[c], Stelios Loukides[c], Spyros Papiris[c], Nickolaos Koulouris[a], Petros Bakakos[a,*]

- **Ουδετεροφιλικό άσθμα**



- **Ηωσινόφιλα στα πτύελα στις βρογχεκτασίες**

- 37.5% had a neutrophilic phenotype,
- 17.5% had an eosinophilic phenotype,
- 12.5% had a mixed neutrophilic-eosinophilic phenotype
- 37.5% had a paucigranulocytic phenotype.

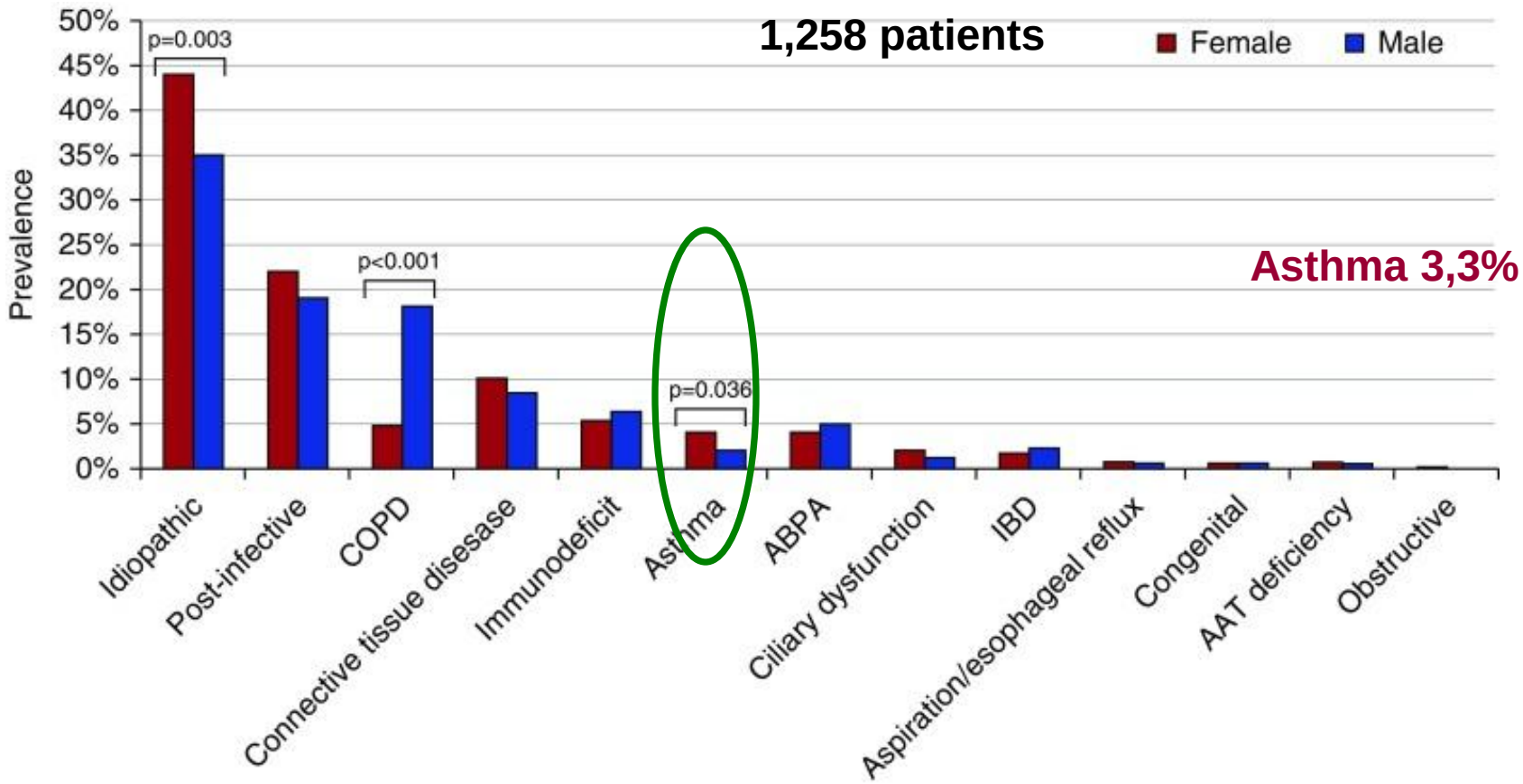


Cytokine 99 (2017) 281–286

Το άσθμα ως αίτιο βρογχεκτασιών

Etiology of Non–Cystic Fibrosis Bronchiectasis in Adults and Its Correlation to Disease Severity

Sara Lonni[1], James D. Chalmers[2], Pieter C. Goeminne[3], Melissa J. McDonnell[4,5], Katerina Dimakou[6], Anthony De Soyza[5,7], Eva Polverino[8], Charlotte Van de Kerkhove[3], Robert Rutherford[4], John Davison[7], Edmundo Rosales[8], Alberto Pesci[1], Marcos I. Restrepo[9], Antoni Torres[8], and Stefano Aliberti[1]



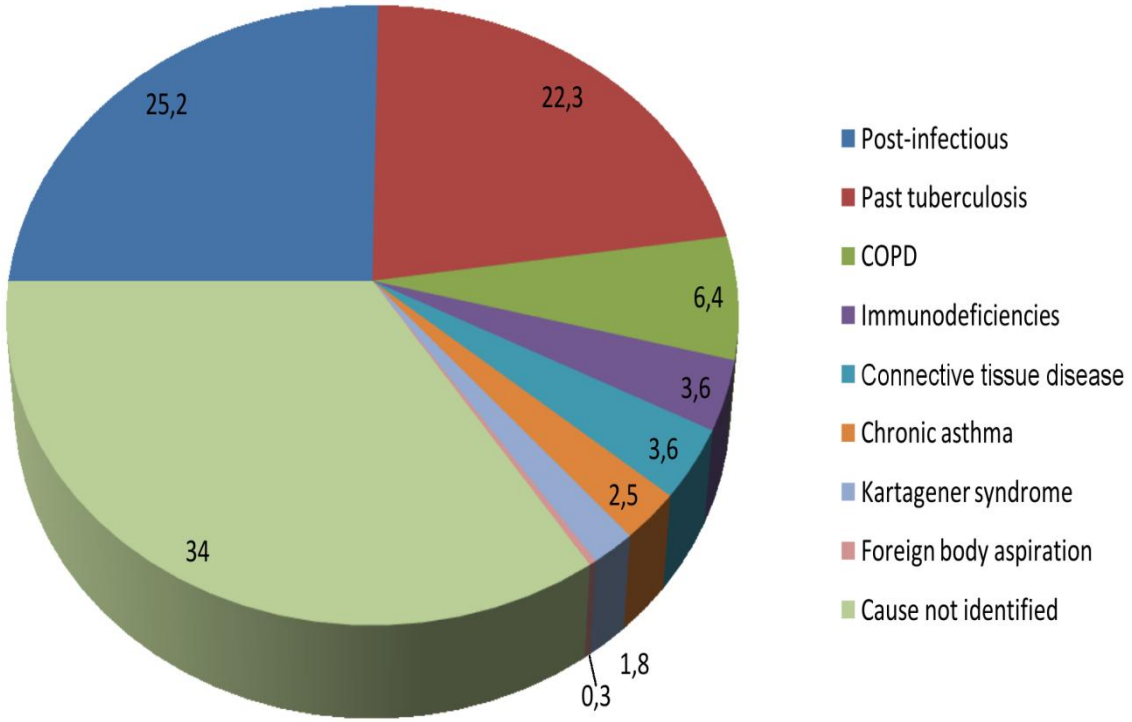
Ann Am Thorac Soc. 2015 Dec; 12(12): 1764–1770.

Αίτ

Non CF-bronchiectasis: Aetiologic approach, clinical, radiological, microbiological and functional profile in 277 patients

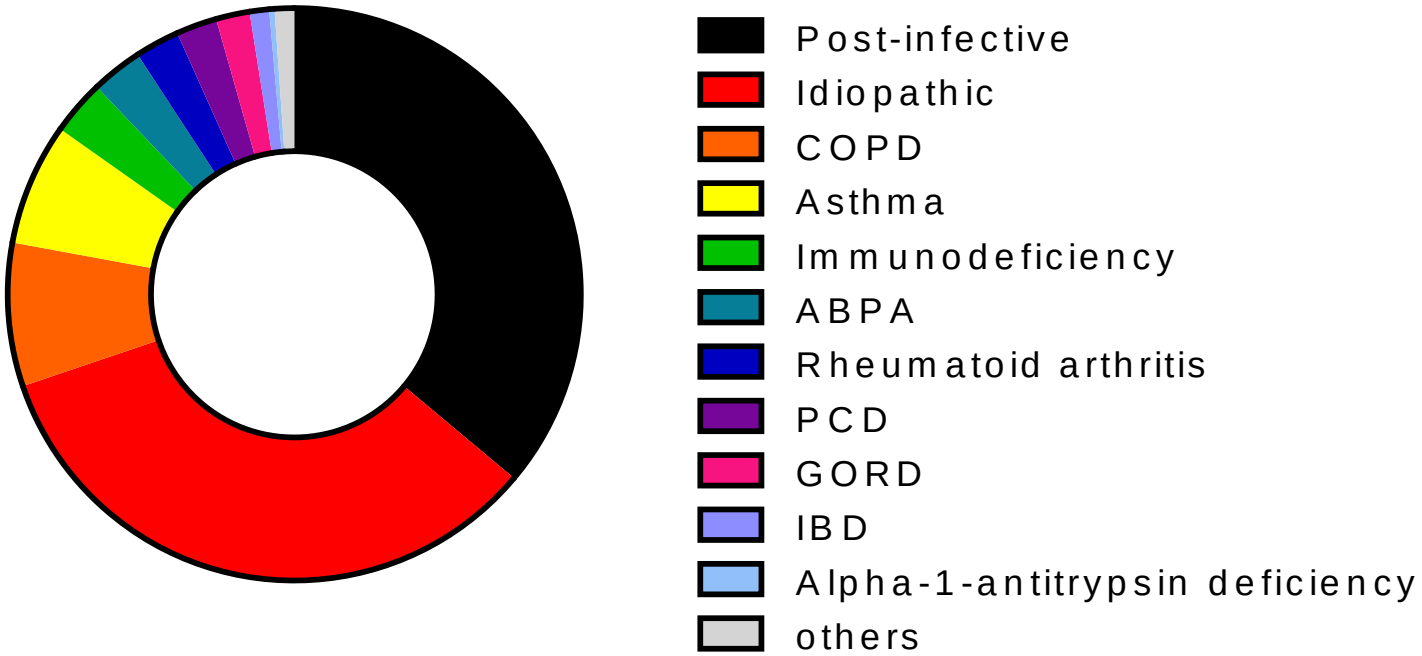
Katerina Dimakou [a], Christina Triantafillidou [b, *], Michail Toumbis [b], Kyriaki Tsikritsaki [b], Katerina Malagari [c], Petros Bakakos [d]

Αίτια βρογχεκτασιών



Dimakou et al. Resp. Med 2016;116. 1-7

EMBARC **αίτια** (12000 patients)



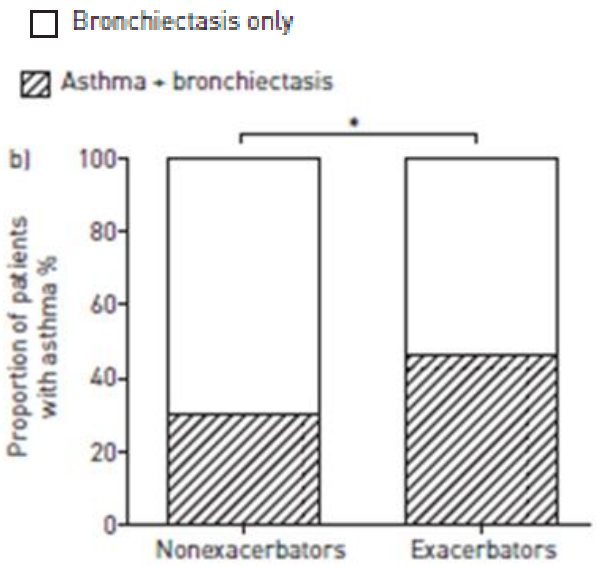
Τό άσθμα επηρεάζει τις παροξύνσεις βρογχεκτασιών;

Asthma and bronchiectasis exacerbation

Ανξάρτητοι παράγοντες κινδύνου για παροξύνσεις

- Ηλικία
- Διάρκεια νόσου
- FEV1
- Άσθμα
- Ψευδομονάδα στα πτύελα
- Βρογχεκτασίες σε >2 λοβούς

Βρογχεκτασίες:249 ασθενείς
Βρογχεκτασίες και άσθμα:241



Bei Mao et al ERJ April 13, 2016

Βρογχεκτασίες σε ασθενείς με άσθμα

CURRENT OPINION

Bronchiectasis and asthma: a dangerous liaison?

Claudia Crimi, Sebastian Ferri, and Nunzio Crimi

Curr Opin Allergy Clin Immunol 2019, 19:46–52

Πόσο συχνά ανευρίσκονται Βρογχεκτασίες στο Άσθμα;

The overlap between bronchiectasis and chronic airway diseases: state of the art and future directions

Eva Polverino[1,2,3], Katerina Dimakou[4], John Hurst[5], Miguel-Angel Martinez-Garcia[6], Marc Miravitlles[1,2,3], Pierluigi Paggiaro[7], Michal Shteinberg[8,9], Stefano Aliberti[10,11] and James D. Chalmers[12]

TABLE 5 Prevalence of high-resolution computed tomography-diagnosed bronchiectasis in patients with severe asthma

Study	Subjects n	BCH prevalence %	Risk factors associated with BCH
Bisaccioni *et al.*, 2009 [104]	105	24.8	NR
Gupta *et al.*, 2009 [111]	467	40	Disease duration, $FEV_1/FVC < 75\%$
Menzies *et al.*, 2011 [17]	133	35.3	Greater airway obstruction, *Aspergillus fumigatus* sensitisation
Luján *et al.*, 2013 [110]	50 SD *versus* 50 NSD	40 *versus* 12	age and steroid dependence
Dimakou *et al.*, 2017 [18]	40	67.5	Sputum, antibiotic courses, bacterial colonisation

Eur Respir J 2018; 52: 1800328

Χαρακτηριστικά ασθενών με άσθμα και Βρογχεκτασίες

Age	+++
Duration of asthma	+++
Smoking history	+
Allergy history	+
Allergy to *Aspergillus* and molds	+
Bronchial obstruction	+++
Bronchial reversibility	+
Sputum production	+++
Mucus purulence	+++
Pathogens in sputum *(P. aeruginosa, (Hemophilus)*	+++
Frequent exacerbations	+++
Frequent use of antibodies	+++
Uncontrolled asthma	+++
Steroids resistance	+++
FeNO > 20 ppb	+
Sputum eosinophils	+
Sputum neutrophils	+++
GERD	+++
Chronic rhinosinusitis	+++
Immune deficiency	++
Response to macrolides	++
Previous pneumonia	+++

Curr Opin Allergy Clin Immunol 2019, 19:46–52

Οι βρογχεκτασίες επηρεάζουν τις παροξύνσεις του άσθματος;

ORIGINAL ARTICLE | http://dx.doi.org/10.4046/trd.2014.77.5.209
ISSN: 1738-3536(Print)/2005-6184(Online) · Tuberc Respir Dis 2014;77:209-214

The Effects of Bronchiectasis on Asthma Exacerbation

	Asthma with bronchiectasis	Asthma alone	p-value
Total asthma exacerbation			
Total number	2.62±3.14	1.78±2.61	
Frequency	1.08±1.68	0.35±0.42	0.004
Steroid use			
Total number	2.14±3.08	1.14±1.66	
Frequency	0.90±1.54	0.26±0.36	0.006
ER visits			
Total number	1.02±1.15	0.18±0.87	
Frequency	0.46±0.84	0.02±0.13	0.001
Hospitalization			
Total number	0.14±0.35	0.7±1.44	
Frequency	0.06±0.22	0.10±0.17	0.4

Values are presented as mean±SD.
Total asthma exacerbation means total number of steroid use, ER visits, and hospitalizations due to asthma exacerbation.
Frequency: number/yr; ER: emergency room.

Tuberc Respir Dis 2014;77:209-214

Ασθενείς με άσθμα και Βρογχεκτασίες

- Πιο συχνές παροξύνσεις άσθματος
- Βαρύτερη απόφραξη αεραγωγών
- Αποβολή πτυέλων
- Υποτροπιάζουσες λοιμώξεις

- *Οι βρογχεκτασίες σχετίζονται με **μακρότερο ιστορικό άσθματος** και κυρίως σοβαρό άσθμα*

Curr.Opin Pulm Med 2019

HRCT σε άσθμα

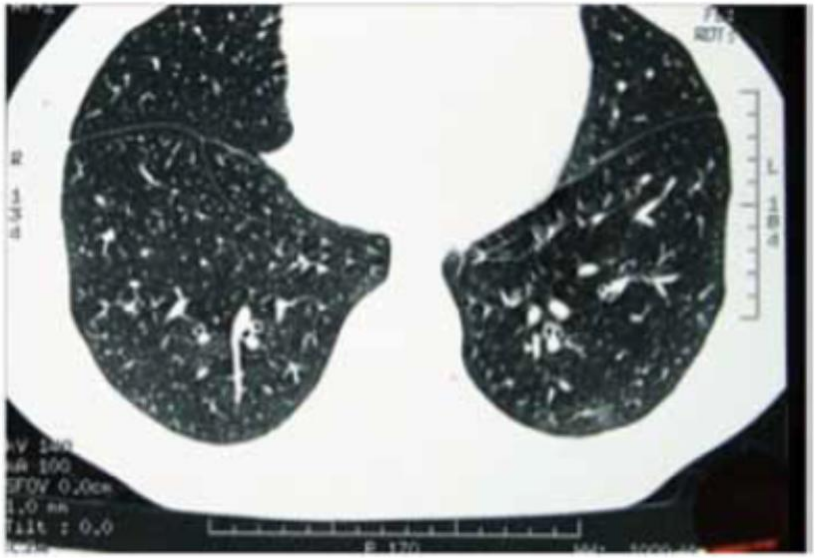


Figure 1: HRCT picture showing bronchial wall thickening.

57.1%

Figure 3: HRCT in expiration.

78.6%

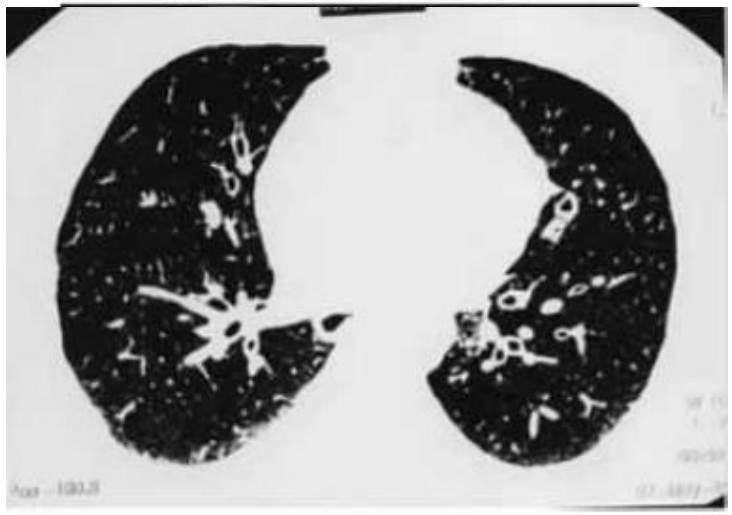
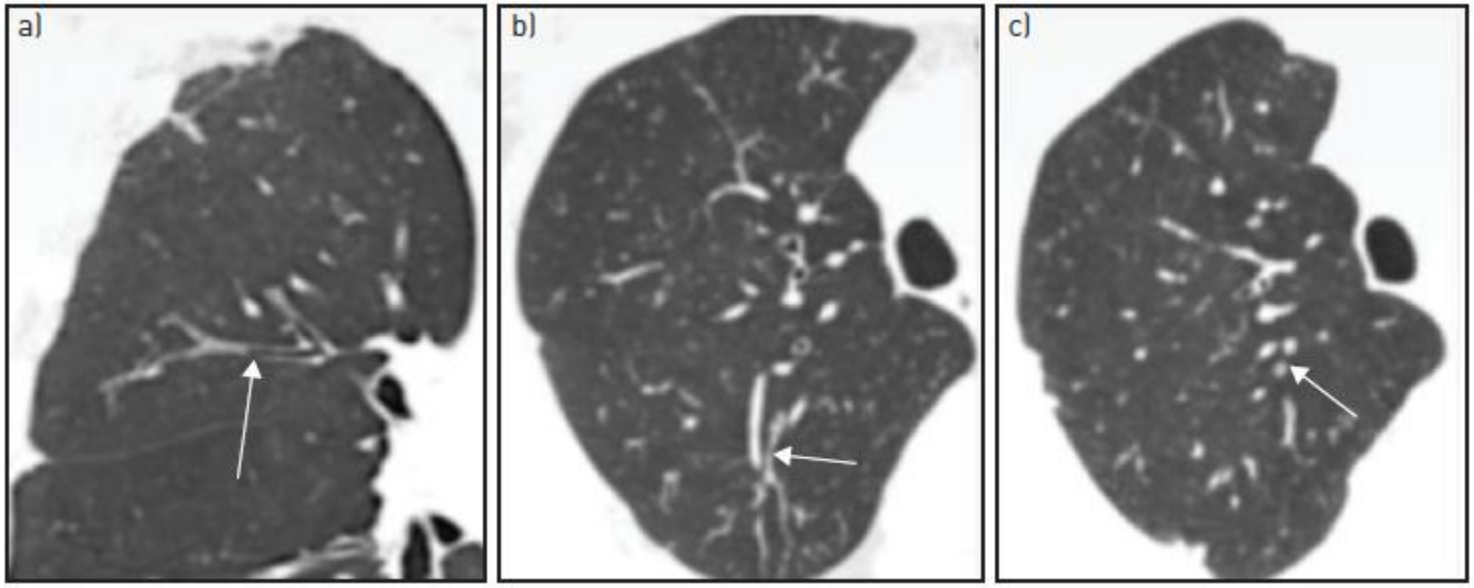


Figure 2: HRCT picture showing bronchiectasis.

28,6%

O Medical Journal (2012) Vol. 27, No. 2: 145-150)

Mucus plugging



Παθογόνα στο άσθμα

- Ο ρόλος των βακτηριδίων στο άσθμα είναι ασαφής
- Πιθανόν αφορά το ουδετεροφιλικό άσθμα

- Εκλυση κυτταροκινών (IL-8 and TNFa)
  ουδετεροφιλική φλεγμονη →
-
- Σε σοβαρό άσθμα,ο αποικισμός με παθογόνα είναι συνήθης, σχετίζεται με τη διάρκεια της νόσου και τις παροξύνσεις

Potentially pathogenic bacteria cultured from the sputum of stable asthmatics are associated with increased 8-isoprostane and airway neutrophilia.

Stable asthma, with no symptoms of respiratory infection

A significant load of potentially pathogenic bacteria (> 10(6) cfu/mL) was cultured from the sputum of 17 (15%) subjects with stable asthma and

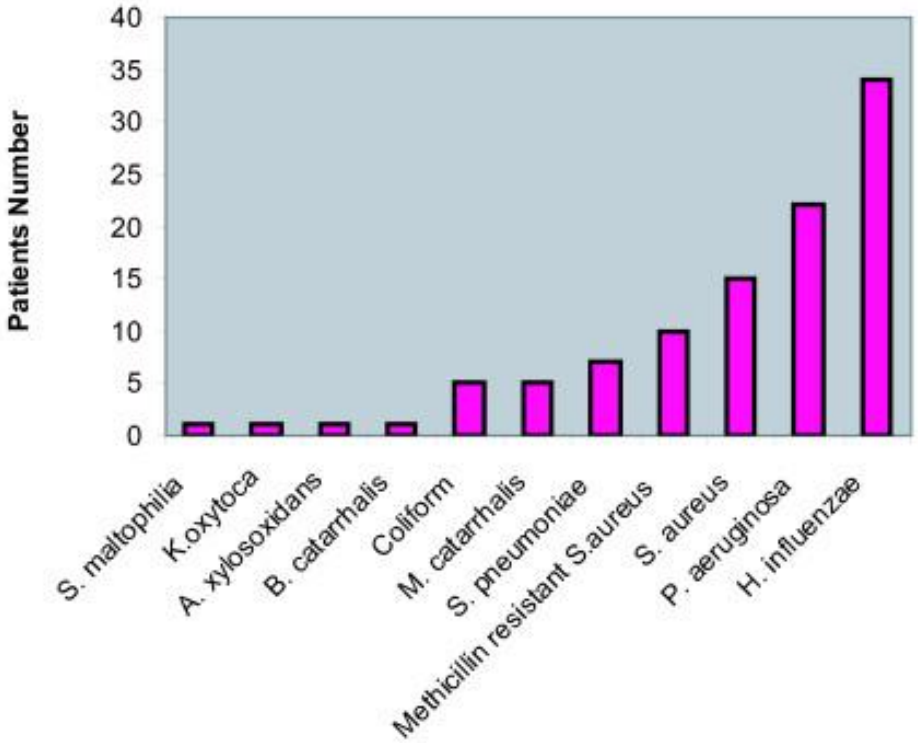
was associated with -higher total cell counts,

- proportion and number of neutrophils,
- sputum IL-8 and 8-isoprostane

Wood LG et al, Free Radic Res. 2010

Bacteria in sputum of stable severe asthma and increased airway wall thickness

29/56 ασθενείς (**52%**) : θετική καλλιέργεια



Zhang et al. Respiratory Research 2012, 13:35

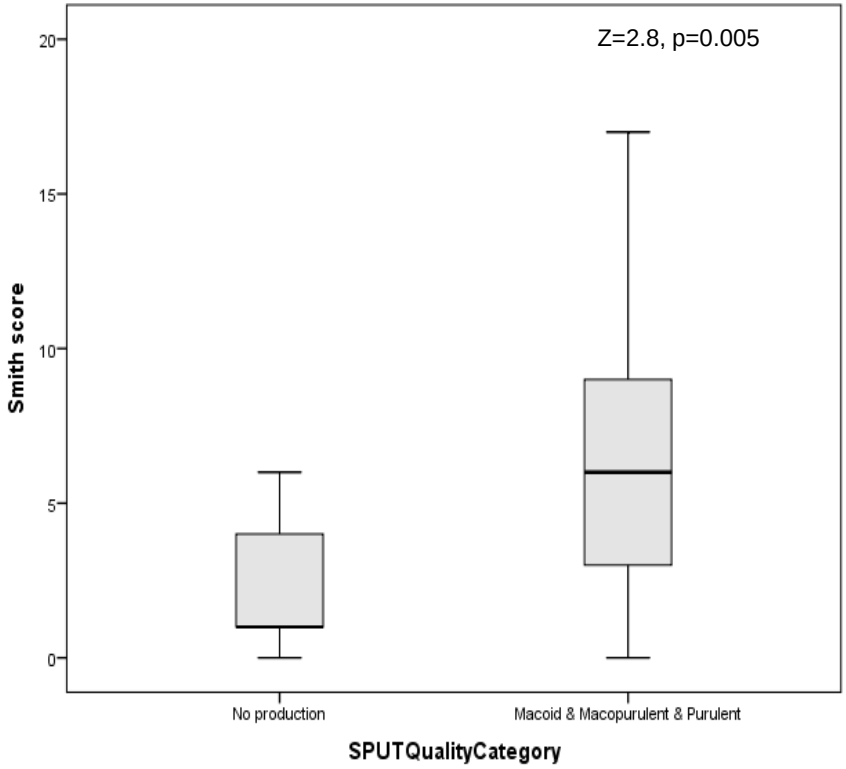
Investigation of bronchiectasis in severe uncontrolled asthma

Katerina Dimakou[1] | Anna Gousiou[2] | Michail Toumbis[3] | Maria Kaponi[1] | Serafeim Chrysikos[1] | Loukas Thanos[4] | Christina Triantafillidou[3]

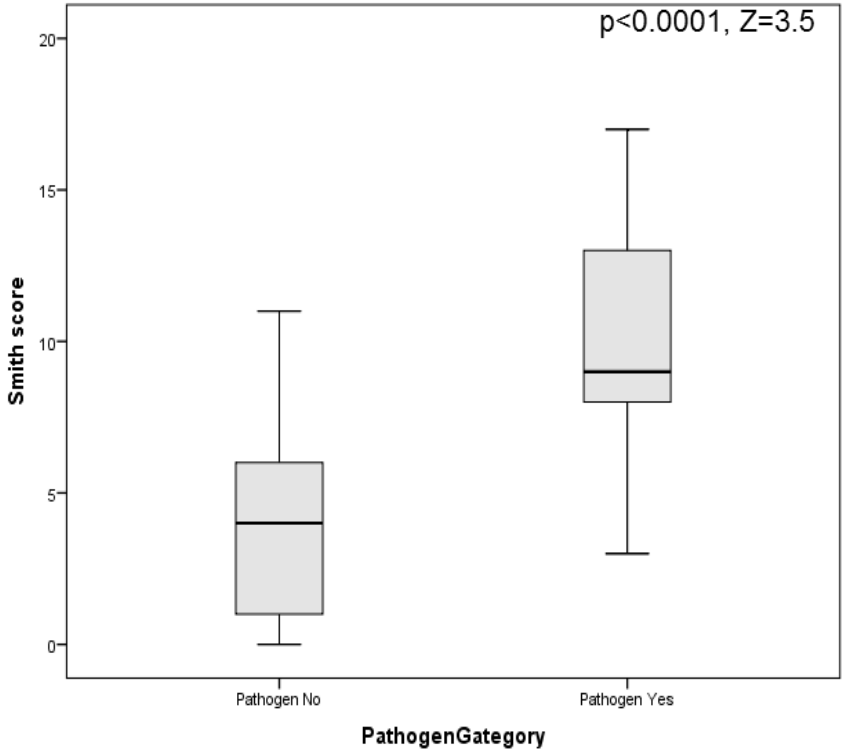
Sputum production (yes/no)	29/11**(72%)**
Mucoid (n)	15
Mucopurulent (n)	12
Purulent (n)	2
Sputum culture (n=40)	
Normal flora/pathogens	31 (77.5%)/9 **(22.5%)**
P.aeruginosa	1
P.aeruginosa+other pathogen	5
Other pathogen*	3

Clin Respir J. 2017;1–7.

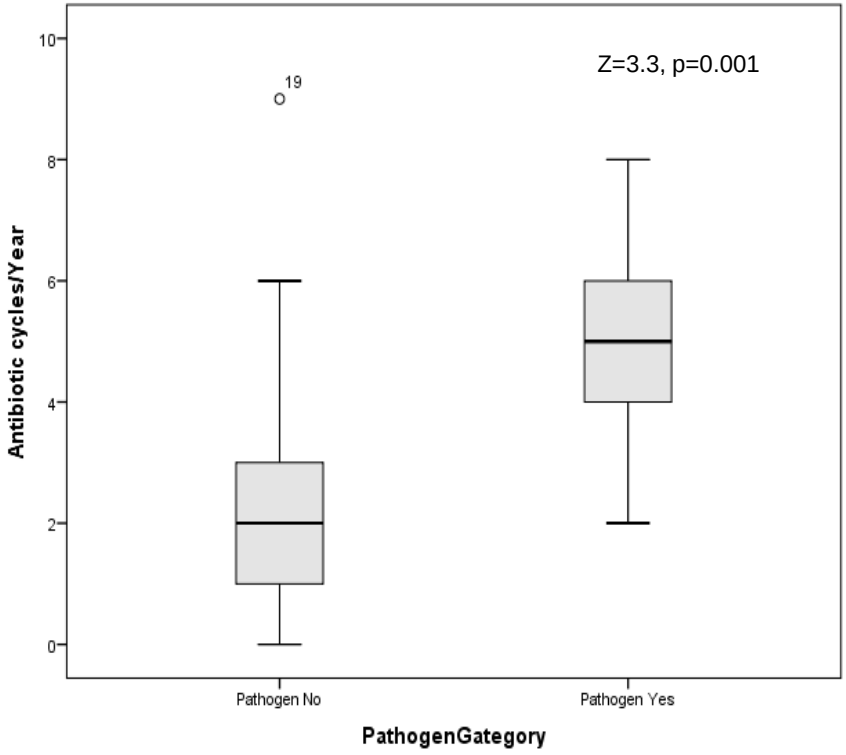
Bronchiectasis score-sputum category



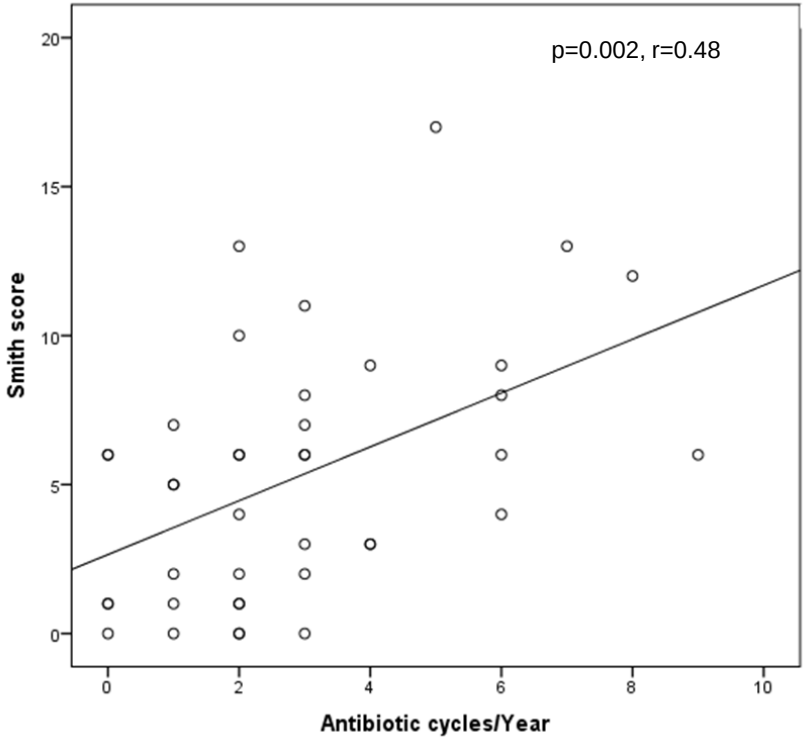
Bronchiectasis score-pathogen category



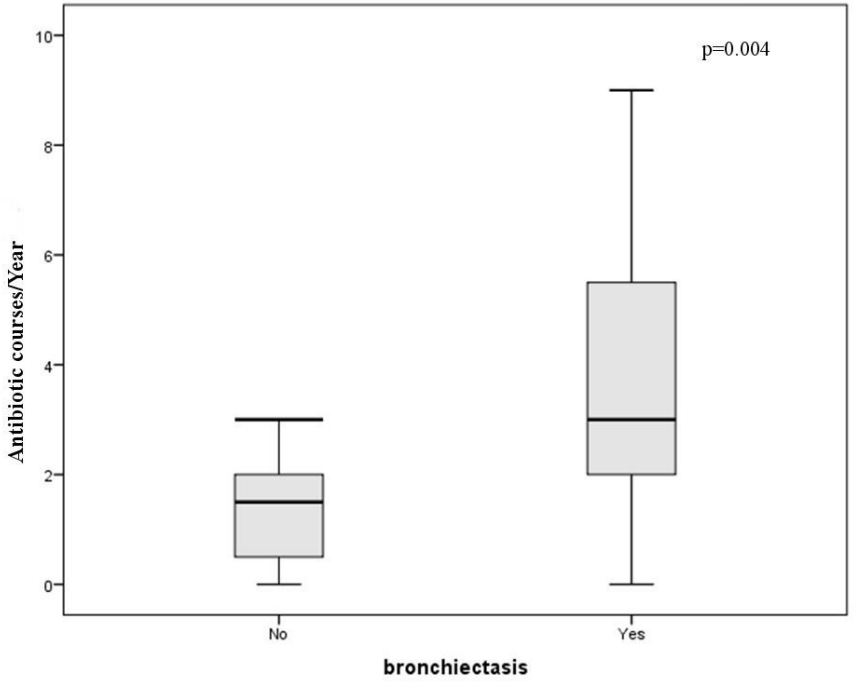
Antibiotic cycles - Pathogen category



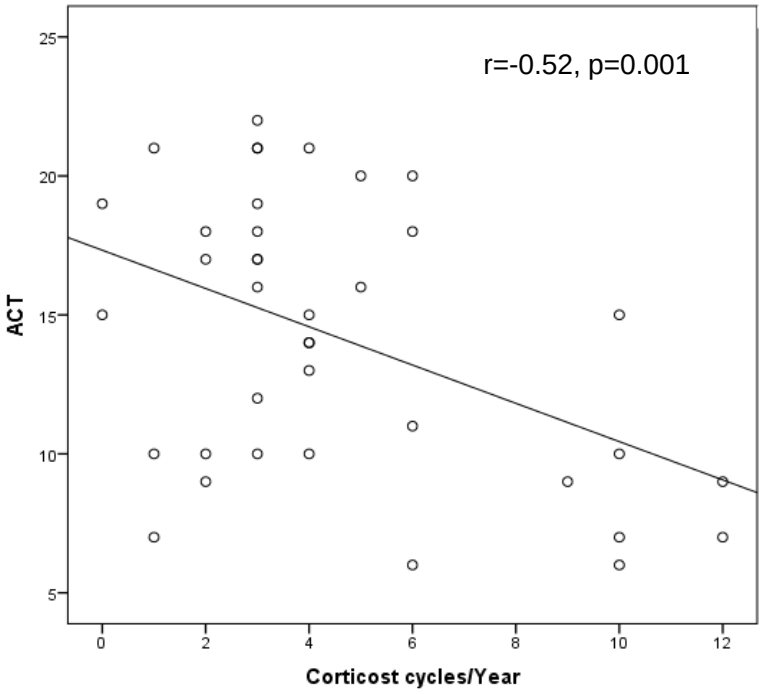
Antibiotic cycles - Bronchiectasis score



Bronchiectasis score- Antibiotic use



ACT- steroid use

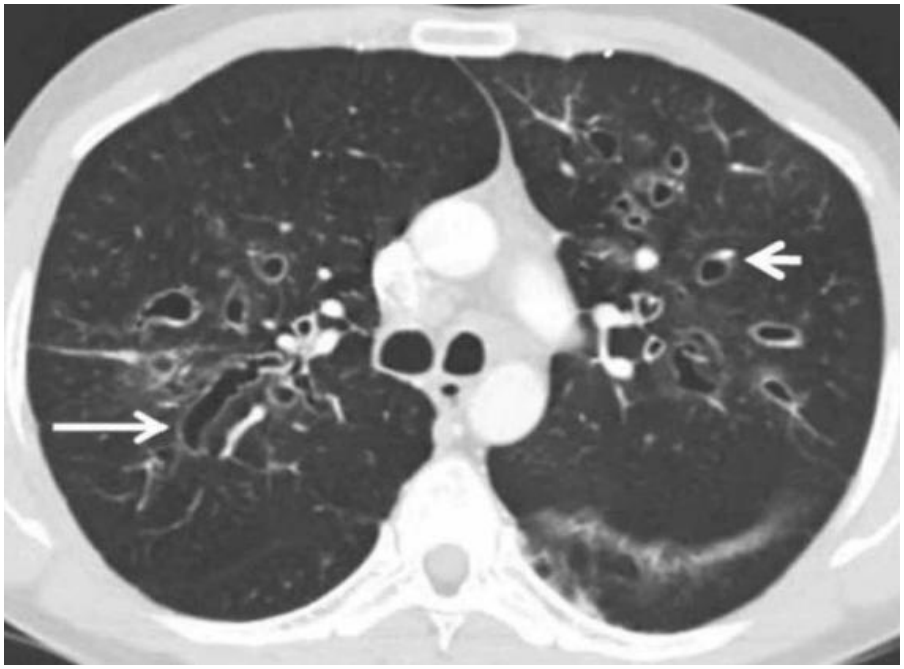


Conclusions

- Bronchiectasis is common in patients with severe asthma.
- Pathogens, mainly Pseudomonas Aeruginosa, are also identified
- Sputum production and pathogen isolation in sputum culture may indicate the presence of bronchiectasis which seems to contribute to the severity of asthma.

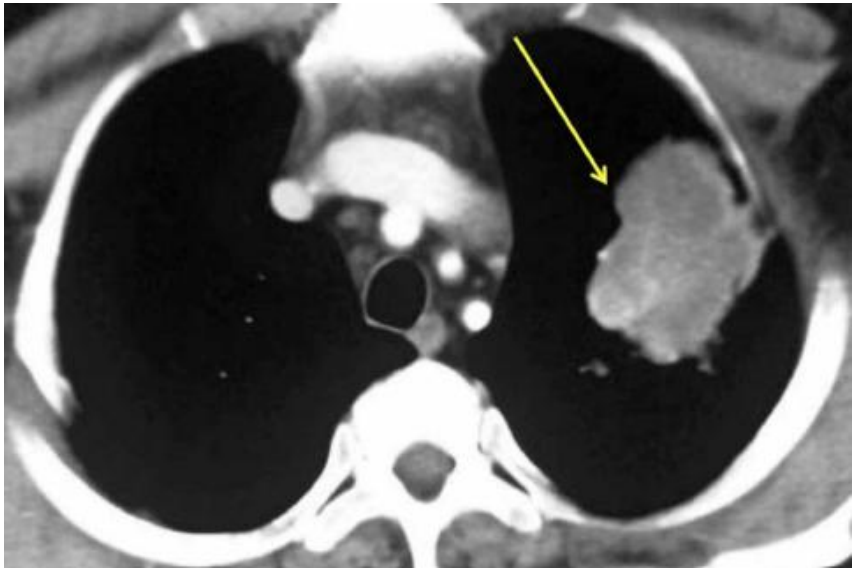
Dimakou et al. Clin Resp J 2017

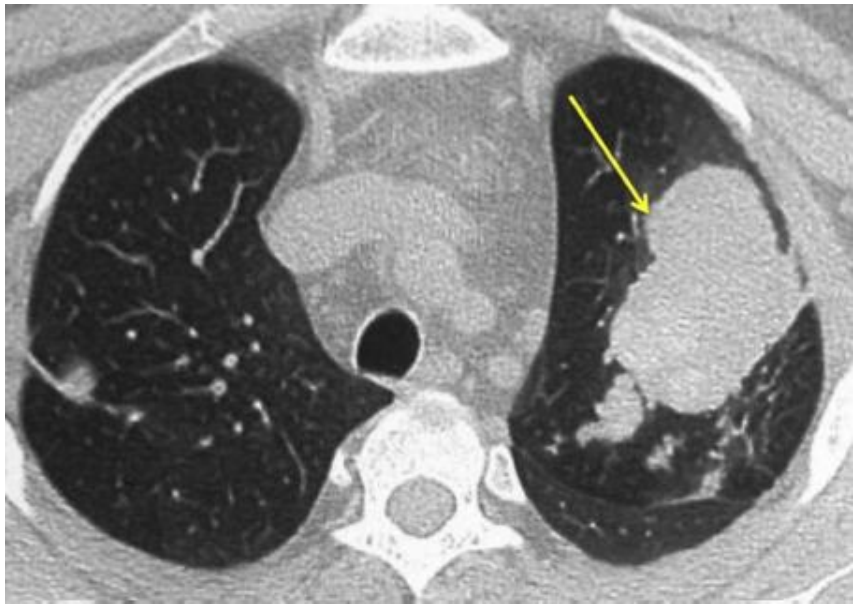
ABPA- Άσθμα- Βρογχεκτασίες



Voskamp AL et al.Allergy Clin Immunol Pract. 2015, 3:192-9. 1
Tillie-Leblond I, Allergy. 2011, 66:1254-6.

Mucus impaction in ABPA

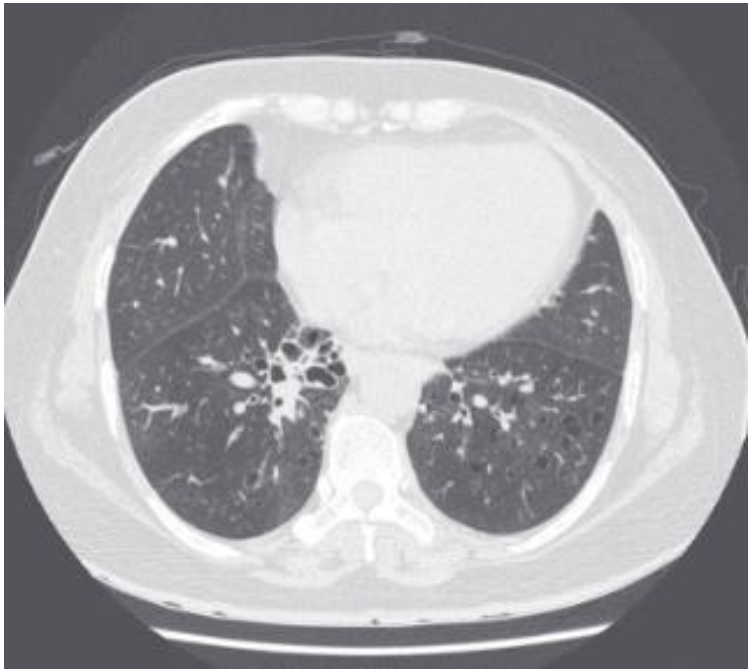


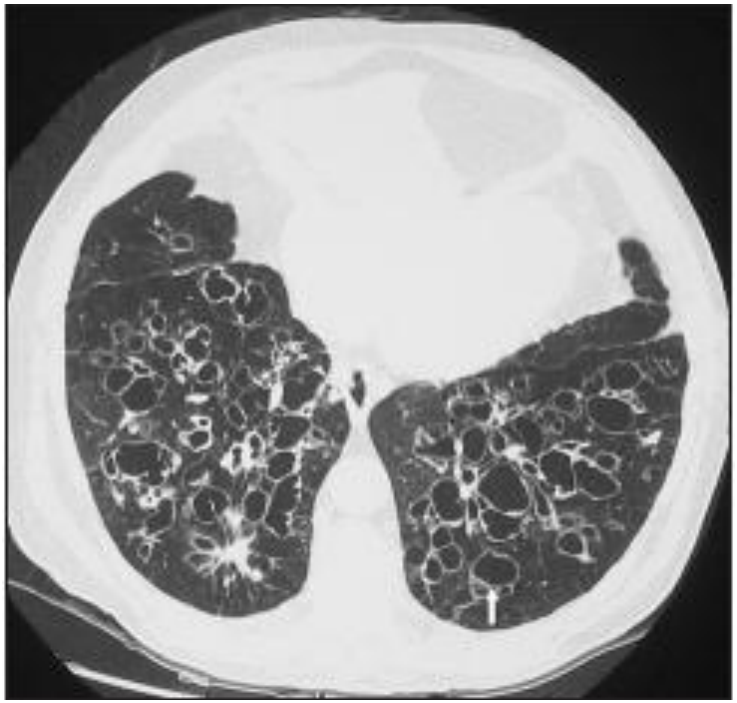


Τι αλλάζει στη διάγνωση και αντιμετώπιση

Τι αλλάζει στη διάγνωση

HRCT





Question 1

Should chest HRCT scans be routinely ordered in patients with symptoms of severe asthma?

Recommendation 1

- We suggest that a chest HRCT only be done when the presentation is atypical

- An atypical presentation of severe asthma includes such factors as, for example, excessive mucus production, rapid decline in lung function, reduced carbon monoxide transfer factor coefficient and the absence of atopy

Τι αλλάζει στην αντιμετώπιση

Η διάγνωση των δύο νοσημάτων
έχει σημασία σε θεραπευτικό επίπεδο;

Therapeutic consequences

- Βρογχοδιασταλτικά;
- ICS;
- Μακρολίδες;
- Εισπνεόμενα αντιβιοτικά;
- Φυσικοθεραπεία

PolverinoE, Dimakou K et al. ERJ 2018

TASK FORCE REPORT
ERS GUIDELINES

European Respiratory Society guidelines for the management of adult bronchiectasis

Eva Polverino[1], Pieter C. Goeminne[2,3], Melissa J. McDonnell[4,5,6], Stefano Aliberti[7], Sara E. Marshall[8], Michael R. Loebinger[9], Marlene Murris[10], Rafael Cantón[11], Antoni Torres[12], Katerina Dimakou[13], Anthony De Soyza[14,15], Adam T. Hill[16], Charles S. Haworth[17], Montserrat Vendrell[18], Felix C. Ringshausen[19], Dragan Subotic[20], Robert Wilson[9], Jordi Vilaró[21], Bjorn Stallberg[22], Tobias Welte[19], Gernot Rohde[23], Francesco Blasi[7], Stuart Elborn[9,24], Marta Almagro[25], Alan Timothy[25], Thomas Ruddy[25], Thomy Tonia[26], David Rigau[27] and James D. Chalmers[28]

ERJ 2017

PICO question 4- Should long term anti-inflammatory treatments be used for patients with bronchiectasis?

Recommendation:

- We suggest **not offering inhaled corticosteroids routinely**
  - conditional recommendation, low quality of evidence.

- ***We suggest that the diagnosis of bronchiectasis should not affect the use of inhaled corticosteroids in patients with comorbid asthma or COPD***

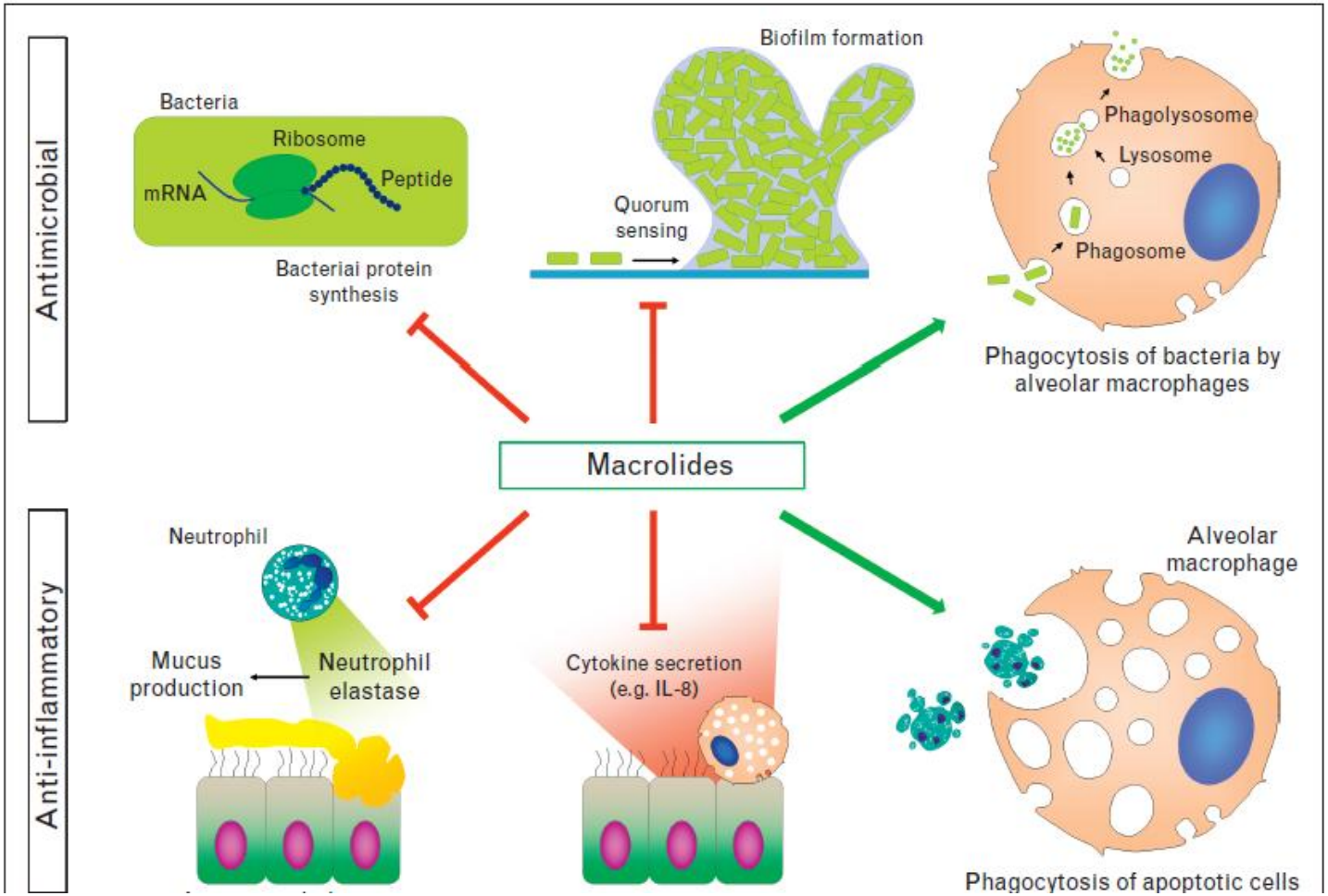
PICO question 7- Is long-term bronchodilator treatment (≥3 months) compared to no treatment beneficial for adult bronchiectasis patients?

Recommendations

- We suggest **not routinely offering long-acting bronchodilators**
  - conditional recommendation, very low quality of evidence
- Except for:
  - patients with significant **breathlessness** on an individual basis
    - weak recommendation, very low quality of evidence.
  - **before physiotherapy, inhaled antibiotics** (↑ tolerability and pulmonary deposition)
    - good practice point, indirect evidence.
  - **comorbid asthma or COPD**
    - good practice point, indirect evidence

Δράσεις μακρολιδών

Asthma



Asthma

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ORIGINAL ARTICLE

Azithromycin for prevention of exacerbations in severe asthma (AZISAST): a multicentre randomised double-blind placebo-controlled trial

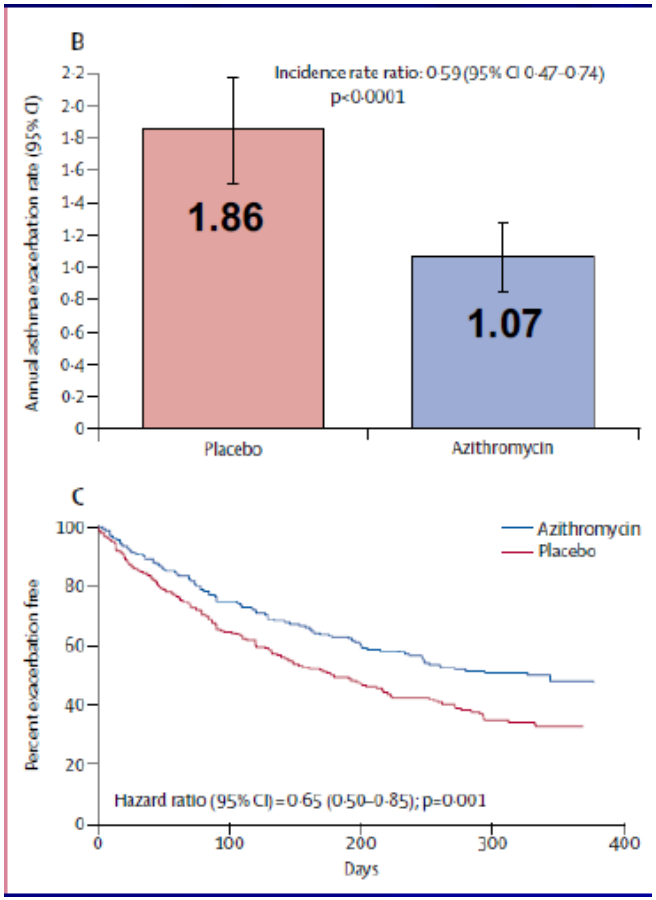
Guy G Brusselle,[1] Christine VanderStichele,[1] Paul Jordens,[2] René Deman,[3] Hans Slabbynck,[4] Veerle Ringoet,[5] Geert Verleden,[6] Ingel K Demedts,[7] Katia Verhamme,[8] Anja Delporte,[1] Bénédicte Demeyere,[1] Geert Claeys,[9] Jerina Boelens,[9] Elizaveta Padalko,[9] Johny Verschakelen,[10] Georges Van Maele,[11] Ellen Deschepper,[11] Guy F P Joos[1]

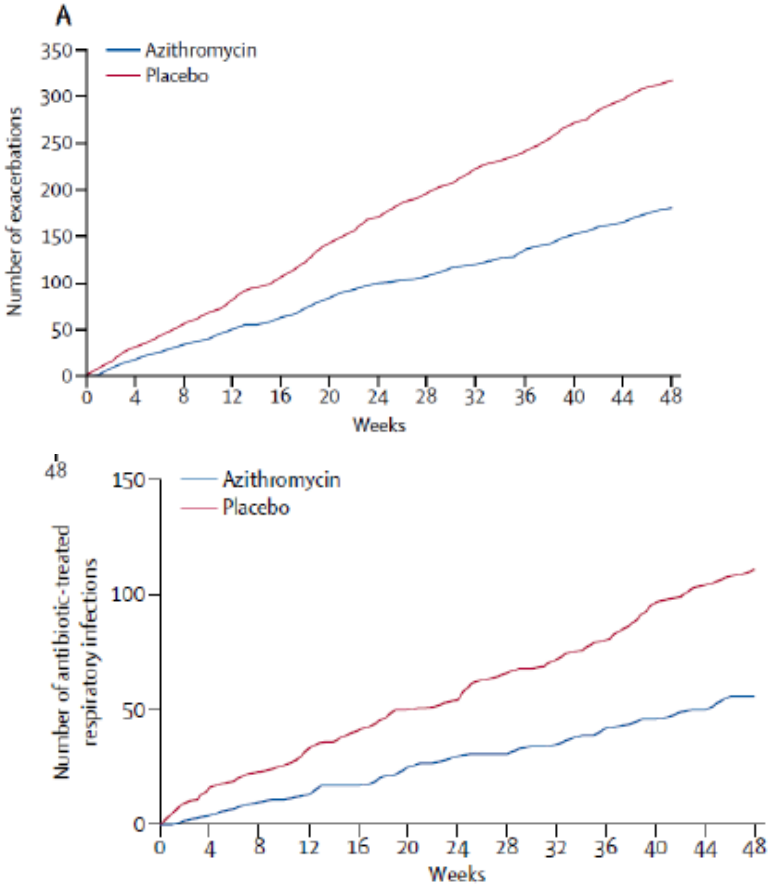
Η χορήγηση χαμηλής δόσης Αζιθρομυκίνης μείωσε σημαντικά τις παροξύνσεις
σε ασθενείς με **μη ηωσινοφιλικό σοβαρό άσθμα**

Thorax 2013; 68:322–329.

Effect of azithromycin on asthma exacerbations and quality of life in adults with persistent uncontrolled asthma (AMAZES): a randomised, double-blind, placebo-controlled trial

Peter G Gibson, Ian A Yang, John W Upham, Paul N Reynolds, Sandra Hodge, Alan L James, Christine Jenkins, Matthew J Peters, Guy B Marks, Melissa Baraket, Heather Powell, Steven L Taylor, Lex E X Leong, Geraint B Rogers, Jodie L Simpson

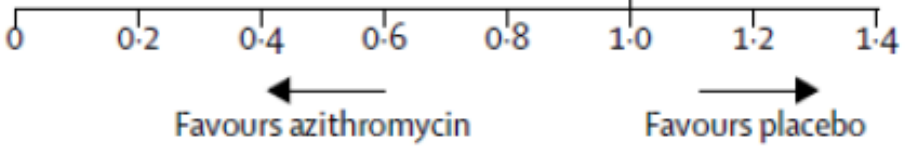




P. Gibson et al, Lancet 2017.

AMASES Trial

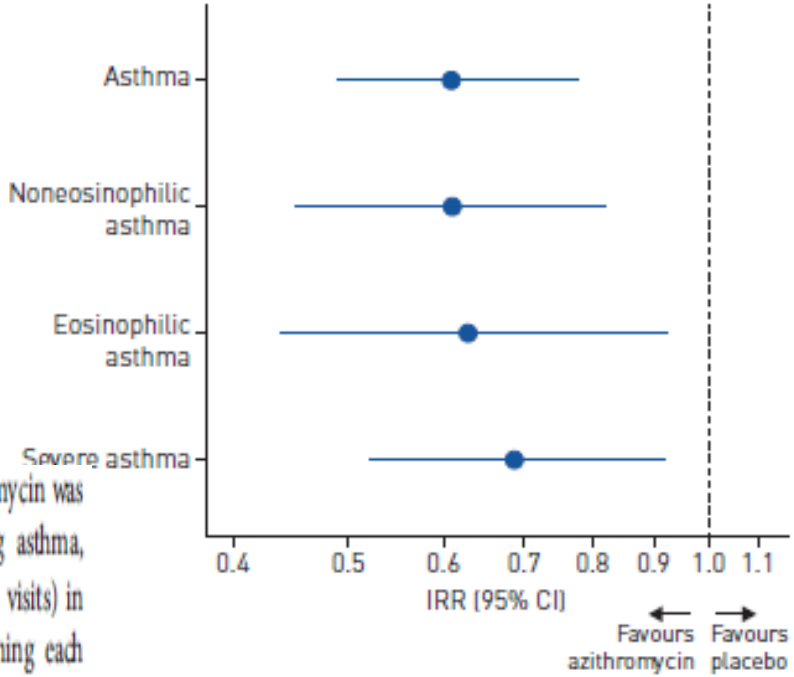
	Number	Exacerbations per person-year		Incidence rate ratio (95% CI)
		Placebo	Azithromycin	
Non-eosinophilic asthma	224	1·74	1·15	0·66 (0·47–0·93)
Eosinophilic asthma	196	1·98	0·96	0·52 (0·29–0·94)
Inhaled corticosteroid dose adjustment	420	1·86	1·07	0·58 (0·46–0·74)
Frequent exacerbators	140	2·79	1·47	0·55 (0·41–0·73)
Cough and sputum VAS	48	1·72	0·79	0·49 (0·26–0·95)
Bacteria–negative	188	1·85	1·18	0·61 (0·52–0·72)*
Bacteria–positive	48	2·64	1·11	0·39 (0·22–0·69)*



P. Gibson et al, Lancet 2017.

Does maintenance azithromycin reduce asthma exacerbations? An individual participant data meta-analysis

Sarah A. Hiles[1,2], Vanessa M. McDonald[1,2,3], Michelle Guilhermino[2,4], Guy G. Brusselle[5,6] and Peter G. Gibson[1,3]



Results: Three studies were identified (n=604). In the IPD meta-analysis, treatment with azithromycin was associated with a reduced rate of exacerbations (oral corticosteroid course due to worsening asthma, antibiotic use for lower respiratory tract infection, hospitalisation and/or emergency department visits) in asthma as well as in the noneosinophilic, eosinophilic and severe asthma subgroups. Examining each exacerbation type separately, patients with eosinophilic asthma reported fewer oral corticosteroid courses, and patients with noneosinophilic and severe asthma reported fewer antibiotic courses. Azithromycin was

Eur Respir J 2019; 54: 1901381

- Εισπνεόμενα αντιβιοτικά;

- Φυσικοθεραπεία, κάθαρση αεραγωγών,
  Υπέρτονο διάλυμα, βλεννορυθμιστικά : ΝΑΙ

Βιολογικοί παράγοντες σε ασθενείς με Άσθμα και Βρογχεκτασίες

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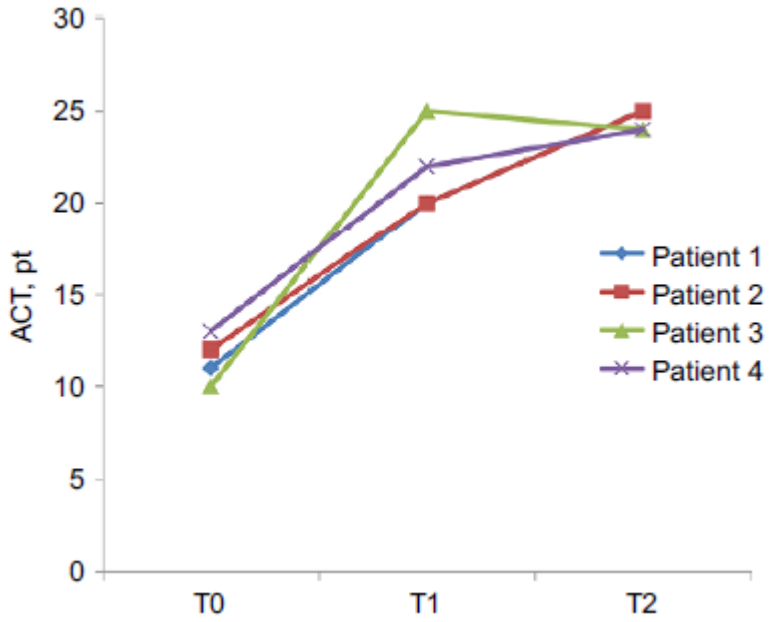
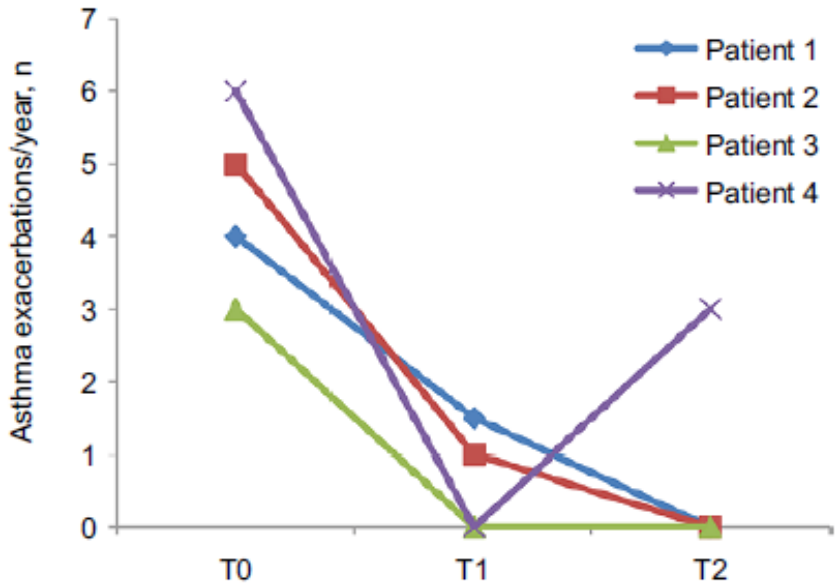
ORIGINAL RESEARCH

Severe uncontrolled asthma with bronchiectasis: a pilot study of an emerging phenotype that responds to mepolizumab

ACT



Παροξύνσεις



Journal of Asthma and Allergy 2019:12 83–90

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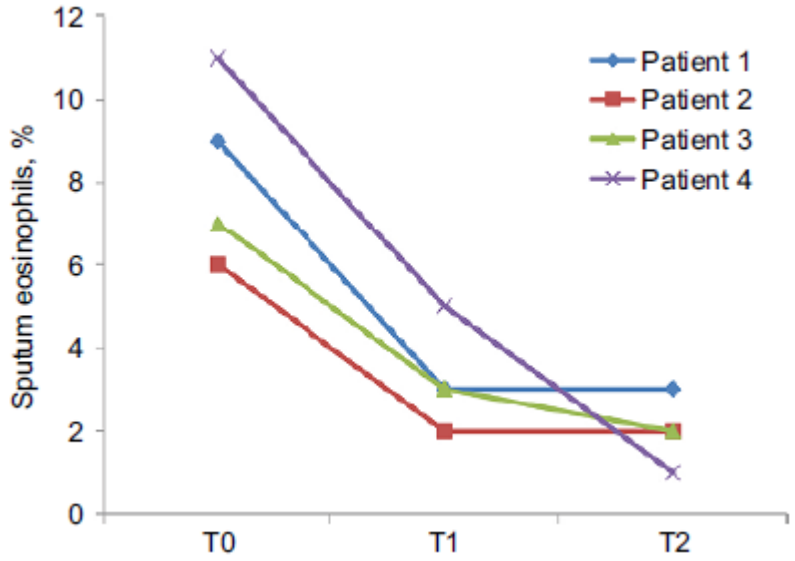
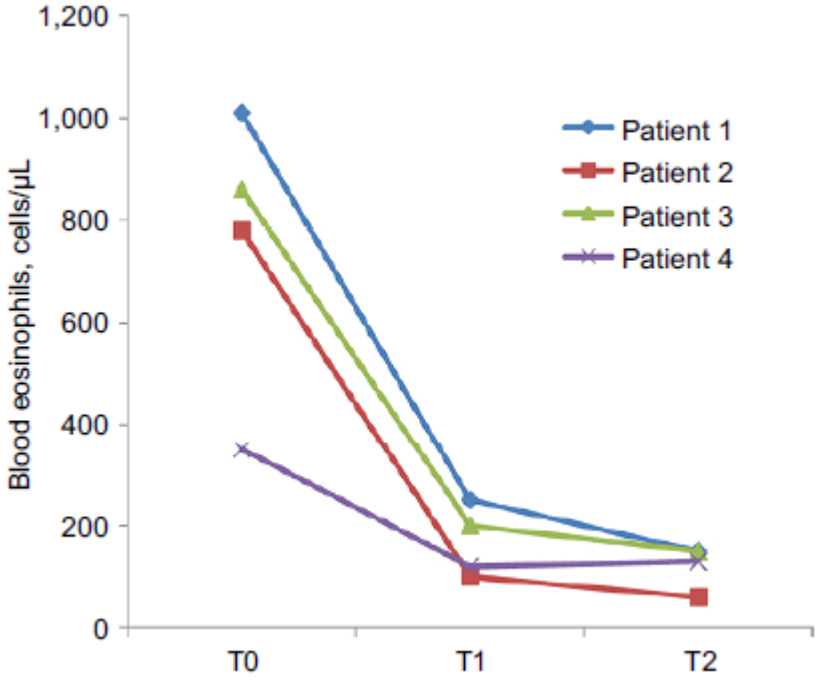
ORIGINAL RESEARCH

Severe uncontrolled asthma with bronchiectasis: a pilot study of an emerging phenotype that responds to mepolizumab

Ηωσινόφιλα πτυέλων



Ηωσινόφιλα αιματος



Journal of Asthma and Allergy 2019:12 83–90

Prevalence, diagnosis and management of co-morbidities in severe asthma

Co-morbidity	Prevalence	Test	Management
Rhinosinusitis/nasal polyps (CRSsNP/CRSwNP†)	50%[10]	CT of sinuses Nasendoscopy (ENT assessment)	Nasal lavage Nasal steroid spray/drops Surgery
Allergic rhinoconjuctivitis†	70%[10†]	History + skin prick test/specific IgE	Nasal steroids Anti-histamines Montelukast
DB	19–52%[12,24]	History/Nijmegen questionnaire	Physiotherapy—breathing retraining
VCD	32–50%[12,46]	Laryngoscopy	Speech therapist
Anxiety/depression	4–17%[1,24]	HADS questionnaire Psychiatric assessment	Medical treatment Psychotherapy
OSAS	31%[62]	Screening with ESS Polysomnography	Weight loss CPAP
Obesity	37%[23]	BMI	Dietician
Gastroesophageal reflux	17–74%[5,10,23,63]	3 months of empirical PPI 24-h pH monitoring	PPI Lifestyle interventions
Bronchiectasis	25–40%[64,65]	HRCT	Physiotherapy, inhalation of hyperosmolar agents, low-dose macrolides
ABPA	1–2%[66]	Total IgE, IgE and IgG to *Aspergillus fumigatus*, HRCT	Prednisolone. Anti-fungal treatment

PORSBJERG C.*Respirology (2017) 22, 651–661*

Συμπεράσματα

- Η συνύπαρξη Βρογχεκτασιών στο σοβαρό άσθμα είναι συχνή και οδηγεί σε σοβαρή νόσο με συχνές παροξύνσεις

- Οι μηχανισμοί που συνδέονται τα δύο νοσήματα δεν είναι πλήρως γνωστοί αλλά μοιράζονται διάφορα χαρακτηριστικά και πολλές συν-νοσηρότητες

- Η έγκαιρη διάγνωση των βρογχεκτασιών σε ασθενείς με βρογχικό άσθμα είναι σημαντική

- Κατάλληλη **θεραπεία και για τα δύο νοσήματα** είναι απαραίτητη
- Στόχος ο έλεγχος των συμπτωμάτων, των παροξύνσεων και των λοιμώξεων

4th World Bronchiectasis & NTM Conference
EMBARC
The European Bronchiectasis Registry
Barcelona 2-4 July 2020
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