ROLE OF ANTIBIOTICS IN NEWLY DIAGNOSED BRONCHITIS IN CHILDREN GUIDED BY SIMPLE BASIC LABORATORY MEASURES.

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Abbreviations

AAP	: American Academy of Pediatrics
ACCP	: American College of Chest Physician
B.i.d.	: Twice daily
B.Pertussis	: Bordetella Pertussis
C.Pneumonia	: Chlamydia Pneumonia
C4	: Cervical Vertebra Number 4
CBC	: Complete Blood Count
CDC	:Center of Disease Control and Prevention
Cm	: Centimeter
CoVs	: Coronavirus
CRP	: C Reactive Protein
DNA	: Deoxyribonucleic Acid
ESR	: Erythrocyte Sedimentation Rate
H.Influenza	: Haemophilus Influenza
HBoVs	: Human Boca Virus
HCoVs	: Human Corona Virus
HPIVs	: Human Parainfluenza Virus
IgG	: Immunoglobulin G
IgM	: Immunoglobulin M
kg	: Kilogram
LRTIs	: Lower Respiratory Tract Infections
M.Pneumonia	: Mycoplasma Pneumonia
mg	: Milligram

NIs	Neuraminidase Inhibitors
NSAIDs	: NonSteroidal Anti-Inflammatory Drugs
PAMPs	: Pathogen Associated Molecular Pattern
RNA	: Ribonucleic Acid
RSV	: Respiratory Syncytial Virus
T3	: Thoracic Vertebra Number Three.
TLRs	: Toll Like Receptors
UK	: United Kingdom
URTIs	: Upper Respiratory Tract Infections
USA	: United States of America
µm	: Micrometer

Abstract

Introduction: In recent years, antibiotic resistance has increased worldwide. The amount of antibiotics consumed in a community is directly related to the amount of antibiotic resistance found in that community. Although most of patients seen for acute bronchitis receive antibiotics, published trials demonstrated no clinically important benefit.

The aim of this work: was to guide antibiotic prescription by clinical data and simple basic laboratory measures.

Patients and methodology: A simple study was performed at General Outpatient Clinics of New Children Hospital - Cairo University, during a period of 5 months starting from the first of November – 2008 till the end of March – 2009. It included 100 patients. Their age ranged from 3 months to 12 years. All cases were subjected to full history taking, general examination, local examination and simple basic laboratory measures including CBC, ESR, and CRP. Blood culture (was carried out for cases with high grade fever only (≥39°C)).

Results: males were more prevalent than females (56% versus 44%). Cough was a cardinal symptom in the current study and it was present in all cases.28% had productive cough. Toxic facies, anorexia and emesis were constituents of infections in 60 % of cases. Conjunctivitis was elicited in 10 % of cases; most of them were preschool children. 28 %of the study group presented with upper respiratory tract manifestations. Among the studied cases 80 % were anemic, while 6% had leucocytosis that was not statistically significant.3 % had bandemia. Lymphocytosis was present in 52 % of cases. In the current research only 2 cases had

positive CRP and both are among the infant age group. Although ESR was elevated in 98% of cases, this increase was not statistically significant. In the current study there was significant correlation between bandemia and fever grade ($P < 0.001$). Also there was significant correlation between leucocytic count and some clinical variables as presence of secretions on local examination of the chest ($P < 0.05$) and toxic facies on general examination ($P < 0.05$).

Conclusion: acute bronchitis in children is usually a self limiting disease and doesn't require antibiotic as a routine medication.

Key word: *NEWLY DIAGNOSED BRONCHITIS MEASURES*

INTRODUCTION

Viral infections are the most common human diseases, particularly acute respiratory tract infections (mostly in children and young adults). Viral infections of the upper respiratory tract in children are proved in 77.4% including viral bronchitis in 58.6%, viral pneumonia in 47.6% and febrile conditions with lymphadenopathy in 44.1% patients ***(Lek, 2008***). However, the organism responsible is rarely identified in clinical practice because viral cultures and serologic assays are not routinely performed. Less than 10% of patients will have a bacterial infection diagnosed as the cause of bronchitis (***Plamer and Bauchner , 1997).***

Recently, antibiotic resistance has increased worldwide. It was found that the amount of antibiotics consumed in a community is directly related to the amount of antibiotic resistance found in this community ***(Mainous et al., 2006).***

Rapid diagnostic tests exist for several pathogens currently linked to acute bronchitis. Simple rapid basic laboratory tests should be used primarily when the suspected organism is treatable, the infection is known to be circulating in the community and the patient has suggestive symptoms or signs (e.g., testing for influenza during influenza season in patients with cough and fever) (***Wenzel and Fowler***, ***2006***).

For the prevention and detection of resistance, a need of rational antibiotic therapy is obvious and national policies or guidelines to address this issue are required. For the appropriate

prescription and use of antibiotics, it is necessary to develop antibiotic policy that aims to improve the quality of prescribing leading to reduction of resistance and cost, and improvement in patient care ***(El-Azizi et al, .2005)***.

AIM OF THE WORK

The main objectives of this work are:

- Confirm that acute bronchitis in children is a self limiting disease and rarely requires antibiotic prescription

- Obtain data from simple basic laboratory measures including CBC, ESR, CRP and blood culture and assess the abnormalities in these labs to guide us in antibiotic prescription.

- Know if there is any significant correlation between the clinical items and any abnormality in these labs.

ANATOMY OF THE RESPIRATORY SYSTEM

The respiratory system is divided into two portions, the upper airways consisting of the nose, pharynx, larynx and the lower airways consisting of trachea, bronchi, and intrapulmonary airways. The lower airways are further distinguished into proximal airways referring to the trachea and the main bronchus, whereas the distal airways or lung consist of the bronchioles and alveolar sacs (alveoli) ***(Tashkin et al., 2002; Tulic et al., 2006).***

The pharynx is a muscular, sleeve-like structure that hangs from the base of the skull and attaches itself to various bones and cartilages along the way. It has openings into the nose, mouth, and the larynx, and then becomes completely circular and continues as the oesophagus. It is divided into three parts, all of which are in direct continuity namely, nasopharynx, oropharynx or mesopharynx, and laryngopharynx or hypopharynx. The primary functions of the upper airway are to conduct, humidify and warm inspired air, prevent foreign materials from entering the lower airway, and contribute to speech, swallowing and smell ***(Des, 2002).***

The larynx is situated between the trachea and the root of the tongue, at the upper and forepart of the neck, where it presents a considerable projection in the middle line. It forms the lower part of the anterior wall of the pharynx. ,.the larynx consists of nine cartilages , three of which are paired and three unpaired and a single bone. The unpaired cartilages are: the thyroid cartilage , which is the largest, the cricoid cartilage which forms the base of the larynx and the epiglottis , a leaf shaped cartilage attached to

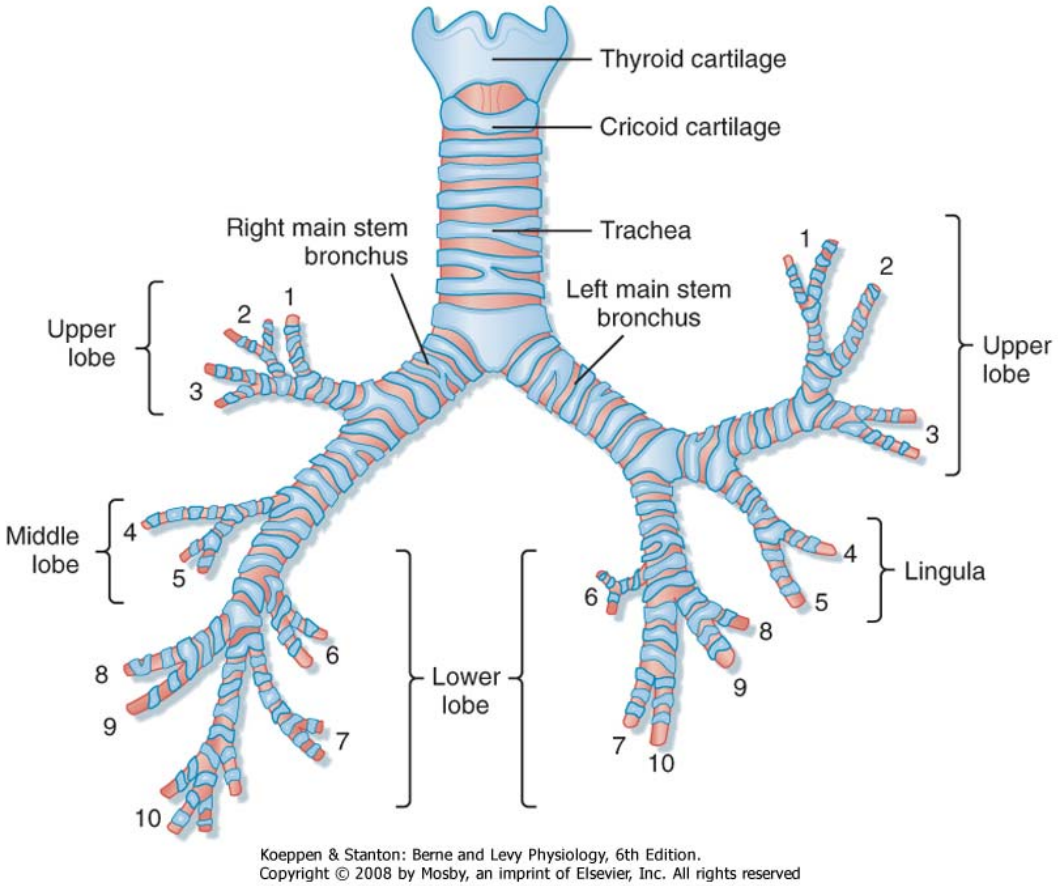
the thyroid cartilage that projects upwards towards the tongue and is located at the top of the larynx. The paired cartilages include: the arytenoids cartilages, the corniculate cartilages and the cuneiform cartilages. The ligaments of the larynx are *extrinsic*,: those connecting the thyroid cartilage and epiglottis with the hyoid bone, and the cricoid cartilage with the trachea; and *intrinsic* : those which connect the several cartilages of the larynx to each other. The muscles of the larynx are extrinsic, passing between the larynx and parts around and intrinsic, confined entirely to the larynx ***(Deem and Miller, 2000).***

The trachea and extrapulmonary bronchi are composed of imperfect rings of hyaline cartilage, fibrous tissue, muscular fibers, mucous membrane, and glands. The trachea is a cartilaginous and membranous tube, extending from the lower part of the larynx, on a level with the sixth cervical vertebra, to the upper border of the fifth thoracic vertebra, where it divides into the two bronchi, one for each lung. The trachea is nearly but not quite cylindrical, being flattened posteriorly. In the child the trachea is smaller, more deeply placed, and more movable than in the adult ***(Scanlan et al., 1999).***

The Right main bronchus , which is wider, shorter, and more vertical in direction than the left, is about 2.5 cm. long, and enters the right lung nearly opposite the fifth thoracic vertebra. The Left main bronchus is smaller in caliber but longer than the right, being nearly 5 cm long. It enters the root of the left lung opposite the sixth thoracic vertebra. The cartilages of the trachea vary from sixteen to twenty in number: each forms an imperfect ring, which occupies the anterior two-thirds or so of the circumference of the trachea, being deficient behind, where the tube is completed by

fibrous tissue and muscular fibers. The cartilages are placed horizontally above each other, separated by narrow intervals. They are highly elastic,. The cartilages are enclosed in an elastic fibrous membrane. The muscular tissue consists of two layers of non-striated muscle, longitudinal and transverse. The mucous membrane is continuous above with that of the larynx, and below with that of the bronchi ***(Geiger and Bronesky., 1997)***.***Fig.(1)***

Figure (1): Bronchopulmonary Segments , Anterior View ([1]).



Each bronchial division is called a generation. After the trachea divides into the right and left main bronchi (generation 1 airways), these are subdivided into lobar and segmental bronchi (generations 2–4).Successive division of bronchi (generations 5–11) yield ever-smaller airways (to about 1 mm diameter), all of which are surrounded by lymphatic and pulmonary arterial branch

vessels. They are supported by their cartilaginous plates and rarely collapse because intra-bronchial pressure is nearly always positive. Bronchioles (generations 12–16) lack cartilaginous support, but are held open by the elastic recoil of the attached lung parenchyma. Subsequent respiratory bronchioles (generations 17–19) have increasing numbers of gas-exchanging alveolar sacs in their walls; these bronchioles are maintained open under tension from surrounding parenchyma. Distally (generation 20–22), alveolar duct walls give rise to some 20 alveolar sacs, containing one third of all alveolar gas. The terminal alveolar sacs (generation 23) are blind-ending ***(Hugh, 2008)***.

The airways from the mouth through the trachea to the terminal bronchioles constitute the conducting airways. They contain no alveoli, don't take part in gas exchange and constitute the anatomical dead space. The last six to seven generations of these airways are connected to tightly packed alveoli, airway chambers in which gas exchange takes place ***(Moore, 2002). Fig. (2)***

Figure (2): Conducting Airways and Alveolar Units of the Lung. ([1]).