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Lower respiratory tract infection LRTI Case Report

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ABSTRACT

Lower Respiratory Tract Infections (LRTI) are infections that affect the airways (below the level of the larynx), including the trachea and the alveolar sacs.

LRTI are characterized in many different ways. Acute infections that affect the airways include acute bronchitis, bronchiolitis and influenza, whereas acute infections that affect the alveolar sacs can include pneumonia.

Infections are caused by tiny organisms known as bacteria or viruses, which are usually the most common cause. They are carried in tiny droplets and passed between people by coughing, sneezing and at times by indirect contact with surfaces. People who are infected usually produce antibodies to fight the virus. If re-infected, the antibodies help to fight the infection with the same strain. Viruses can change forms and manifest in different strains, causing the body to produce new antibodies. Less frequently, these bacteria can go on to cause a LRTI.

Key words: Acute bronchitis, Influenza, Bronchiolitis,Pneumonia.

Acute Bronchitis

Acute bronchitis is an infection of the bronchi, the large passages that connect the windpipe and the lungs. Bronchitis causes swollen and irritated bronchi. It can last for a few weeks, but it may be accompanied by a cough that can persist for over a month.

Acute bronchitis is usually caused by a viral infection, such as the common cold, and is sometimes referred to as a "chest cold." Less often, it may be caused by a bacterial infection such as bordatella pertussis (whooping cough). In most healthy people, bronchitis will get better without treatment. However, in some people, bronchitis leads to more serious issues. This is particularly true for people who have other health problems, like asthma or COPD.

Treatment Options

Antibiotics do not help the many lower respiratory infections which are caused by parasites or viruses. While acute bronchitis often does not require antibiotic therapy, antibiotics can be given to patients with acute exacerbations of chronic bronchitis The indications for treatment are increased dyspnoea, and an increase in the volume or purulence of the sputum The treatment of bacterial pneumonia is selected by considering the age of the patient, the severity of the illness and the presence of underlying disease. A systematic review of 32 randomised controlled trials with 6,078

participants with acute respiratory infections compared procalcitonin (a blood marker for bacterial infections) to guide the

initiation and duration of antibiotic treatment, against no use of procalcitonin. Among 3,336 people receiving procalcitonin-guided antibiotic therapy, there were 236 deaths, compared to 336 deaths out 3,372 participants who did not. Procalcitonin-guided antibiotic therapy also reducedthe antibiotic use duration by 2.4 days, and there were fewer antibiotic side effects. This meansthat procalcitonin is useful for guiding whether to use antibiotics for acute respiratory infectionsand the duration of the antibiotic Amoxicillin and doxycycline are suitable for many of the lowerrespiratory tract infections seen in general practice.

***PROCALCITONIN**

Procalcitonin (PCT), a protein that consists of 116 amino acids, is the peptide precursor of calcitonin, a hormone that is synthesized by the parafollicular C cells of the thyroid and involvedin calcium homeostasis. Procalcitonin arises from endopeptidase-cleaved preprocalcitonin.

The reference value for procalcitonin in adults is less than 0.1 ng/mL. Levels greater than 0.25 ng/mL can indicate the presence of an infection

***Amoxicillin**

***BRAND NAME(Amoxicillin) - Amoxil**

***ROUTE OF ADMINISTRATION – Tablets , chewable tablets, suspension liquid by mouth and as IV AND IM**

*Uses

1. **Amoxicillin is an antibiotic. It's used to treat infections caused by certain types of bacteria.**
2. **Amoxicillin oral tablet comes as immediate-release (IR) or chewable tablets. The chewabletablet and IR tablet are only available as generic drugs.**
3. **Amoxicillin also comes as a capsule and a suspension. All forms are taken by mouth.**

***CLASS**

Amoxicillin is in a class of medications called penicillin-like antibiotics. Itworks by stopping the growth of bacteria

*Mechanism of Action –

Amoxicillin competitively inhibits penicillin-binding protein 1 and other high molecular weight penicillin binding proteins.9,10 Penicillin bind proteins are responsible for glycosyltransferase and transpeptidase reactions that lead to cross-linking of D-alanine and D-aspartic acid in bacterial cell walls.10 Without the action of penicillin binding

PHARMOCODYNAMICS-

Amoxicillin competitively inhibit penicillin binding proteins, leading to upregulation of autolytic enzymes and inhibition of cell wall synthesis.9,10,5 Amoxicillin has a long duration of action as it is usually given twice daily. Amoxicillin has a wide therapeutic range as mild overdoses are not associated with significant toxicity.patients should be counselled regarding the risk of anaphylaxis, Clostridium difficile infections, and bacterial resistance.

Pharmacokinetics

Absorption

Amoxicillin is stable in the presence of gastric acid and is rapidly absorbed after oral administration. The effect of food on the absorption of amoxicillin from the tablets and suspension of AMOXIL has been partially investigated; 400-mg and 875-mg formulations have been studied only when administered at the start of a light meal.

Orally administered doses of 250-mg and 500-mg amoxicillin capsules result in average peak blood levels 1 to 2 hours after administration in the range of 3.5 mcg/mL to 5.0 mcg/mL and 5.5 mcg/mL to 7.5 mcg/mL, respectively.

Mean amoxicillin pharmacokinetic parameters from an open, two-part, single-dose crossover bioequivalence study in 27 adults comparing 875 mg of AMOXIL with 875 mg of AUGMENTIN® (amoxicillin/clavulanate potassium) showed that the 875-mg tablet of AMOXIL produces an AUC0-∞ of 35.4 ± 8.1 mcg•hr/mL and a Cmax of 13.8 ± 4.1 mcg/mL. Dosing was at the start of a light meal following an overnight fast.

CONTRAINDICATIONS

AMOXIL is contraindicated in patients who have experienced a serious hypersensitivity reaction (e.g., anaphylaxis or Stevens-Johnson syndrome) to AMOXIL or to other β- lactam antibiotics (e.g., penicillins and cephalosporins).

Adverse side effects

Among the more common side effects for amoxicillin (Amoxil) are: Diarrhea, Stomach upset, Headache, Abnormal taste sense

DOXYCYCLINE

BRAND NAME: Adoxa

ROUTE OF ADMINISTRATION: As Orrally taken, as IV TOO AS POWDER MIXED WITH LIQUID, Tab

DOSAGE: General Dosage

- **Initial: 200 mg/day divided twice daily orally/intravenously (IV) on the first day (IV may be given once/day), THEN**
- **Maintenance: 100-200 mg/day once/day or divided once every 12 hours orally/intravenously (IV) (IV may be given once/day)**
- **Specific dosing varies depending on the condition being treated; consult your doctor.**

**Uses:*

Doxycycline is used to treat many different bacterial infections, such as acne, urinary tract infections, intestinal infections, respiratory infections, eye infections, gonorrhea, chlamydia, syphilis, periodontitis (gum disease), and others. Doxycycline works by stopping the growth of bacteria when treating bacterial infections and is also thought to have an anti-inflammatory action when used for other conditions. Doxycycline is a tetracycline antibiotic.

Some forms of doxycycline are used to prevent malaria, to treat anthrax, or totreat infections caused by mites, ticks, or lice.

***CLASS : Doxycycline belongs to the class of medicines known as tetracycline antibiotics.**

MECHANISM OF ACTION:Protein synthesis is essential for survival and functioning of cells, including bacteria.[7] Doxycycline inhibits bacterial protein synthesis by allosterically binding to the 30S prokaryotic ribosomal subunit. The drug blocks the association charged aminoacyl-tRNA (aa-tRNA) with the ribosomal Asite, which is the acceptor site on the mRNA-ribosome complex. Doxycycline ultimately impedes the elongation phase of protein synthesis and halts the production of essential proteins for bacterial survival and functioning.

Doxycycline mediates anti-inflammatory actions by preventing calcium-dependent microtubular assembly and lymphocytic proliferation, thereby inhibiting leukocyte movement during inflammation. It also inhibits nitric oxide synthase, which is anenzyme that produces nitric oxide, an inflammatory signaling molecule.

Pharmacodynamics

Doxycycline and other tetracyclines are mainly bacteriostatic and are thought to exert antimicrobial effects by the inhibition of protein synthesis. They suppress the growth of bacteriaor keep them in the stationary phase of growth.3 Tetracyclines have antimicrobial spectrum of activity against a variety of gram-positive and gram-negative microorganisms.11 Cross- resistance of these microorganisms to tetracyclines is a common occurrenceAs it is a highly lipophilic drug, doxycycline crosses multiple membranes of target molecules.8 Doxycycline shows favorable intra-cellular penetration, with bacteriostatic activity against a wide range of bacteria.9 Doxycycline also exhibits antiparasitic properties 1,2,3 and anti-inflammatory actions.4,8 Its anti-inflammatory effects were investigated in various inflammatory skin conditions, such as bullous dermatoses and rosacea.

PHARMACOKINETICS: Doxycycline is virtually completely absorbed after oral administration with a bioavailability of ranging from 73-95%.Following an oral doseof 500 mg, the C_{max} of 15.3 mg/L was reached in four hours.

Following a 200 mg dose, normal adult volunteers averaged peak serum levels of 2.6 mcg/mL of doxycycline at 2 hours, decreasing to 1.45 mcg/mL at 24 hours. While ahigh-fat meal lowers C_{max} and the rate of absorption, the effect is not clinically significant.

Contraindications

***Pregnancy or breastfeeding due to teratogenicity and permanent teeth discoloration after in utero exposure.**

***Children under the age of 12 due to teeth discoloration.**

***Allergy to tetracycline antibiotics.**

***Use with penicillin or isotretinoin.**

ADVERSE DRUG REACTIONS

severe headaches, ringing in your ears, dizziness, nausea, vision problems, pain behind your eyes; loss of appetite, upper stomach pain (that may spread to your back), tiredness, nausea or vomiting, fast heart rate, dark urine, jaundice (yellowing of the skin or eyes).

CASE REPORT:

A 45year old female patient was admitted in the pulmonology ward of KIMS-hyderabad (Krishna institute of medical sciences) with her chief complaints of C/O Fever since 2 days,At present C/O SOB since 2 days,No C/O Cough,No C/O urine output,No C/O swelling of legs .

Has No past history of illness,and as Of Now patient Admitted for supportive care as of for Lower respiratory tract infection along of Acute exocarbation of bronchitis/Tranmucosal immediate release Fentanyl

H/O HTN - since year No H/O

CAD

NO Oathopenia /PHD No B/C

Redal ademo

On general examination she was conscious and coherent. On physical examination her vitals were found to be Blood pressure- 110/70 mmHg, Temperature- 98.6F°, spo2- 64%, Heart rate -86 b/min RR-20 b/min.

On systemic examination reveals that, S1,S2 –(+), , CVS/RS - NAD. ,CNS-E4McVs

For further confirmation she was subjected to laboratory investigations such as COVID raft ,CBP,LFT, RFT, EGG,2D ECHO,D -Dimer,Procalcitonin , CRP which are as follows and cardiology and infectious diseases

WBC – 29280 cells/cumm , Hb- 10.1mg/dl ,PCV-36.9 ,RBC- 5.36,platelets-3.13,and creatinine-0.74mg/dl, total bilirubin-0.82,

***others as Procalcitonin-10.47, NT Pro BNT-1090,CPK MB-2.68,RA FACTOR -21.3., so she wastreated with,**

INJ. Magnex Forte -1.5gm IV BID , INJ. Pan-40mg IV BD, INJ. Hydrocortisone- 100mg ,TID, IV , Inj optinueron 100 ml,1amp,OD,IV.,T.AZCE–500mg,PB,D/O,T.shclcr-500mg-BD-D/O,T.PULMOCLR -1TAB-B/O,T.Odimont-1tab-O/D,P/O,Neb -duolin,budcosst-QID(ANTI - ASTHAMIC DRUG) then the patient showed steady improvement with given therapy ,and was discharged.

DISCUSSION :

Thus the above mentioned drugs which are used in treating(Lower respiratory tract infection along of Acute exocarbation of bronchitis/Tranmucosal immediate release Fentanyl) at of under WHO SCALE usage and have cleared form of actions .

CONCLUSION:

Thus, the main motive of this written report is to create awareness in hospital sectors about thedrug reactions and necessity to provide patient counselling of term wise use of medicine.

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