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A REVIEW ON ANTIBIOTIC RESISTANCE IN PNEUMOCOCCAL DISEASE

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ABSTRACT
Antimicrobial resistance is an important concern at global level. In developing countries like in India the data collected from hospitals or some community based data showed increment in the burden of this problem. This paper discusses the situational analysis of antimicrobial resistance with its complication, determining factors, setbacks along with plan of action for future to reduce the burden in India. Recent data collected from Google search, and other research sources which was reviewed by the authors. According to the data collected there is an urgent need to develop and strengthen antimicrobial policy, standard treatment guidelines, national plan for contaminant of AMR and research related to public health aspects of AMR at community and hospital level in India.

Keywords:
Antimicrobial resistance, Pneumonia complications, Determining factors, Setbacks, India.

I. Introduction

Common acquired pneumonia is a disease which is the significant concern of World health characterised by infections of the pulmonary parenchyma acquired in individuals from outside in hospital setting without any recent hospitalisation.
It is one such type of infection that is spitting very fast this days and has become a scourge. According to the data it is spreading more in developing countries over 500 million cases and above 50 million deaths annually. The spread of the disease and associated mortality/morbidity depends on many things such as age, geographical location, prevailing antimicrobial resistance patterns, season and antimicrobial prescription practices.
It infect both the upper and lower respiratory tract and its caused by many bacteria and viruses such as pneumonia Escherichia coli, streptococcus pneumonia, staphylococcus aureus and many more. Some bacteria are responsible for death in pneumonia such as klebsiella pneumonia, Escherichia coli, streptococcus pneumonia, acinetobacter baumannii, staphylococcus aureus and others. Pulmonary infiltrates visible on chest radiographs for computer tomography scan is defined as common acquired pneumonia along with symptoms like fever, cough, and dyspnea.
As per the World health organisation India is responsible for 23% of global burden of common acquired pneumonia and 36% of the regional burden. India is a developing country so there are no well regulated antibiotic practices due to which there were 297000 deaths where attributable and 1042500 that we are associated. Approximately 4 million common acquired pneumonia cases incident annually in India with 20% requiring hospitalisation. In India the annual incidence rate is between 5 and 11 per 1000 people. Among 5% out patients considered under mortality rate and about 10% hospitalised patients and 30% transcend in intensive care units. The third leading reason for hospital admission is pneumonia about 544000 accounting for hospitalisation from the ED annually. The rate of common acquired pneumonia remain stable over the past four decades even after advances in medicine. It is now more common after direct birth. currently children are facing a lot of this comfort due to this disease some children are experience morbidity as a result of respiratory tract infection and they received courses of antibacterial repeatedly which cannot be effective against viral infectious agents and increases bacterial resistance.
Most frequently occurred infections of all human diseases includes sore throat, ear ache, laryngitis, common cold, otitis media, sinusitis and other most of the tropical countries have respiratory tract

infection is a leading cause of hospitalisation and death. Pneumonia infection of a lower respiratory test is the most common complication of acute respiratory tract infection need to taking preventive measures due to special risk for determine population groups.

II. Literature

In patient resistance to antibiotics with diagnosed community acquired or nosocomial acquired pneumonia triggered by p. aeruginosa or MDR P. aeruginosa this quality controlled observational study where examined retrospectively. In January 1, 2004 to August 12, 2014 the data were collected from hospital charts such as at the HELIOS clinic, written/ Herdecke University in Wuppertal Germany.

According to the outcomes patients suffering from community acquired pneumonia caused by p. aeruginosa constituted the study group the patients suffer from nosocomial acquired pneumonia caused by p. aeruginosa or MDR p. aeruginosa were the reference group. At HELIOS clinic, the majority of pneumonia patients are treated.

Several key steps involved in research of antimicrobial resistance in pneumonia which include sample collection, bacterial isolation, and identification and susceptibility testing. Bronchoalveolar lavage (BAL) or Endotracheal aspiration (ETA) open includes sample collection while identification of bacteria relies on biochemical testing and culture.

To determine the effectiveness of various antibiotic susceptibility testing uses methods like the kirby-baver disk diffusion test. In this method antibiotic impregnated disc were placed on a agar plates inoculated with bacteria and to determine susceptibility measures does zone of inhibition around the disc. The susceptibility testing results are used to guide selection of antibiotic for treatment.

Problem Burden

The issue of AMR arisen and impacts of that affects the health of both human and animals. In the field of healthcare facilities, agriculture practices, and veterinary medicine the excessive and improper utilisation of antibiotics has expedited the emergence of drug resistance of microorganisms. The emergence of antibiotic resistance bacteria has results the excessive dependence of antibiotics which pose significant challenges in treatment and can lead to severe infections.

In the 21, AMR has emerged as one of the most significant threats to human health. The second and third line therapy has driven which is more expensive, more toxic ,and require longer treatment durations due to lose of effective first line antimicrobials. Due to extended hospitalisation drain prolonged illness of individual and healthcare system out patient clinic visit laboratory testing and isolation precaution associate because of AMR infection. Due to the limited capacity to control infections and the absence of effective antibiotics routine procedures like surgery ,organ transplantation ,chemotherapy and neonatal care could become exponentially more dangerous.

About 10% of the one million under 5 childhood deaths annually in India due to pneumonia, pneumococci. Pneumococcal resistance to beta lactams is caused by mutation in penicillin binding proteins. In 2008 the back point for defining resistance to penicillin and cephalosporin were rewised downward for meningeal isolates and upward for non- meningeal isolates.

In India resistance in pneumonia is increasing. Singh et al. in a review of 7 studies (2009 - 2016) in children under 5 years of age reported the incidents of resistance to penicillin is 10% and to cefotaxime as 4%. Globally pneumonia is the leading cause of child mortality in every 43 second one child dies because of pneumonia. In pneumonia treatment antibiotics are a critical component but AMR is making antibiotic less effective. Streptococcus pneumonia the most common bacterium causing community acquired pneumonia in children is becoming increasingly resistance to antibiotics. In niethan researchers found that 98.9% of this infections are resistance to the first line antibiotic penicillin.

Factors responsible for worsening of antimicrobial resistance pneumonia in India

Combination of factors are responsible for the worsening of antimicrobial in pneumonia in India, which includes overuse and misuse of antibiotics coupled with inadequate infection control practices and limited public awareness along with this factors other factors are also responsible such as substandard medications and lack of regulation in animal husbandry contribute to the rapid development and spread of the drug-resistance bacteria.

Factors responsible for worsening of AMR in pneumonia in India includes

1. Inappropriate prescription-

Antibiotics are often prescribed for viral infections of when not medically indicated resulting in unnecessary exposure and selection of resistance bacteria.

2. Self medication-

Readily available over the counter purchase of antibiotics contributes to their misuse and contributes to resistance

3. Incomplete courses-

Not completing the prescribed course of antibiotic give resistance strains a chance to survive and proliferate.

4. Poor sanitation and hygiene-

The spread of infections diseases increases due to poor sanitation and inadequate hygiene increasing the need for antibiotics and driving resistance.

III. Recent Developments

In the past decades a large number of new initiative have been launched by various agencies to contain this problem, agencies include India clen (Indian clinical epidemiology network) which has generated some quality data on AMR in pathogens like pneumococcus H. influenza, 2nd MAR (India initiative for management of antibiotic resistance), INSAR (India network for surveillance of anti-microbial resistance).

In India several initiative are under developed to address the problem. A national antibiotic policy is being prepared which highlights about the hospital in incorporation into their guidelines.

IV. Challenges

1. Over use and misuse of antibiotic.
2. Inadequate diagnostics.
3. Poor health of public infrastructure.
4. New drug development challenges.
5. Poor sanitation ,endemic infections, malnutrition.
6. Lake of coordination.
7. Standard operating guidelines.

V. Conclusions

This significant global health problem is antibiotic resistance pneumonia this problem is also faces by India is a substantial burden. The over use of antibiotic, misuse of antibiotic causes emergence and spread of drug resistance bacteria also including bacteria which causes pneumonia. All of these are complex issue and required multiple approaches such as public awareness regulatory frameworks, enhanced stewardship programs and others. They studies based on hospital should varied spectrum of resistant and different regions their should be urgent need to develop and strength and antimicrobial policy, standard treatment guidelines and national plan for containment of AMR in India.

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