**Case Report**

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# A Rare Case Study on Escherichia Coli Pneumonia

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## ABSTRACT:

Pneumonia (from the Greek pneuma, "breath") is an infection and inflammation of the lower respiratory tract (bronchioles and alveoli) that can be fatal. It is caused by inhaled bacteria and viruses. High temperature, shortness of breath, fast breathing, severe chest pain, and a productive cough with thick phlegm are all common symptoms. Community-acquired pneumonia is a type of pneumonia that occurs outside of a hospital setting. Nosocomial or hospital acquired pneumonia is pneumonia that occurs 48 hours or more after admission to the hospital. In this case study, we look at how pneumonia affects the respiratory system and how it's treated. The purpose of this study is to warn professionals to the possibility of a pneumonia diagnosis. This is the case report of 24-year-old male patient. He was diagnosed with pneumonia. His treatment was starting and after 7 treatments, he became completely recovered. For his disease diagnosis different tests are also performed.

**Keywords-** Pneumonia, Escherichia coli, *Shwasanaka jwara*

## INTRODUCTION

**Escherichia Coli: -** E. coli is the most abundant facultative anaerobic bacterium in the normal human intestine. Its presence clearly associated with infections of gastrointestinal tract, urogenital tract and peritoneum and occasionally with infection at distant loci after bacteremia. It is rarely with the pulmonary infection and lung.[1] E. coli, in rare chance is present in lung. **Escherichia coli** pneumonia causing pulmonary cavities is very rare and the few cases reported are of pneumatocele formation. Here we present an unusual case of **Escherichia coli** infection as a rare cause of bilateral cavitation's necrotizing pneumonia .[2] India accounts for 23% of the global pneumonia burden and 36% of the WHO regional burden. National estimates may, however hide significant sub national disparities. Community Acquired Pneumonia in the United States is more than 5 million per year; 80% of these new cases are treated as outpatients with the mortality rate of less than 1%, and 20% are treated as inpatients with the mortality rate of 12% to 40% .[3]

- **Pneumonia (*Shwasanaka Jwara*)[4]:-**
  1. Major cases of concern in India (1/3 of case constituted by this)
  2. Leading cause of death (under 5years)
  3. 90% death due to respiratory distress is due to pneumonia.
  4. Pneumonia- inflammatory process involving the lung parenchyma.

5. Bacterial pneumonia- primarily spreading inflammation of the terminal bronchioles and its related alveoli.
6. Lobar pneumonia-(consolidation) pathological state of the lung where alveolar air has been replaced by exudates and transudates.
7. Recurrent pneumonia- two episodes of pneumonia in one year or more than three episodes at any time with radiographic clearance between two episodes.

**Signs and symptoms: -**

1. Pneumonia can occur at any age although it is more common is younger children.
2. Pneumonia accounts for 13% of all infectious illness in infants younger than 2 years. Infections with group streptococcus, Listeria monocytogene or gram-negative rods (e.g. Escherichia coli, Klebsiella pneumonia) are common cause of bacterial pneumonia.
3. Cough is the most common symptom of pneumonia along with difficulty in breathing and hypoxemia.
4. These may be accompanied by congestion, fever, irritability and decreased appetite.
5. Headache, pleurisy, chest pain and vague abdominal pain.

***Shwasanaka Jwara*[5]:-**This can be compared to pneumonia. The bacilli diplodocus pneumonic is also responsible for this disease. This has been divided into lobar and bronchial types. In pneumonia high fever, cough, asthma, severe pain in chest, sometimes coughs with the sputum which is blood tinged, severe weakness and feeble pulse in seen.5

- *Shwasanaka Jwara-Lakhasa* colour in sputum, cough with blood, *Shwas*, *Kasa*, *Jwara*, (high fever) *Vedana* in *Phushasa* (chest pain).
- According to *Bhavmishra Shwasanaka jwar* describe in *Kakrkotak Sannipataj*(usually fever beging with chill) and *Tivra Vegi Jwara* (high grade nature of fever) *Aaruchi* (anorexia),*Trishna*, *Parshavshula* (chest pain) *Kasa*, *Shwas Vridhi* (Tachymia), *Kapha (*cough), tongue as if *Khara*(hard)*Pratatam kantha koojanam.* These features of respiratory tract infections (either bacterial or viral) like sore throat, fever, headache, nausea, pharyngitis, laryngitis, conjunctivitis, cough, malaise etc resemble with the *Lakshanas* of *Sam Sanipataj Jwar* like, '*Kantha Shookairiva'*, '*Jwara'*, '*Shiro Ruja'*, '*Aruchi'*, ' *Sroto Paaka'*/'*Kantha Shookairiva'*, '*Mookatwa'*, '*Saasraave Kalushe Rakta Lochane'*, '*Kaasa'* and '*Srastaangata'* respectively.[6]
- *Lakshanas* (signs & symptoms) like- *Jwara*, *Aruchi*, *Kaasa*, *Shwaasa*, *Saasraave Kalushe Rakta Lochane*, *Rastaangata*, *Asthi Sandhi Ruja*, *Saswanau Sarnau*, *Karnaruja*, *Kantha Shookairiva*, *Kaphayukta Raktashteevana* and *Pratatam Kantha Koojana* denotes upper respiratory tract infection (bacterial/viral) and pneumonia. '*Kantha Shookairiva'* (feeling of thorns at throat) denotes acute inflammation of the pharynx, '*Mookatwa'* (loss of voice) may be due to laryngitis (inflammation of larynx/voice box), '*Karnaruja'* (pain in ear) and '*Karna swanau'* (tinnitus) denotes 'Otitis media' (inflammation of the middle ear).

**Synonyms: -** ***Puphuspak*, *Puphuspardahak*, *Kakrkotak Sannipataj*, *Raktshithvii*** etc.[7]

## AIMS AND OBJECTIVES

To assess the efficacy of *Ayurvedic* management in Pneumonia

**Case presentation: -**

A 24-year-old male patient with complain of difficulty in breathing, shortness of breath at the time of talking, cooking. Patient also suffered from cough, fever, general weakness and unable to do his daily works since one year. Patient has past illness history of pneumonia. Patient gave history of receiving oral antibiotics treatment during past months. Then he came to National Institute of Ayurveda OPD no.-3 and Reg. no-11211102019 on date 11/10/2019.There was no past history of any systemic inflammatory disease, allergic disorder, whooping cough, etc. Patient had no family history of lung disease. Patient had no other significant medical problem like hypertension, DM etc. Patient was not having any relevant personal history of tobacco and smoking.

**On Examination**: -Patient was febrile, has tachycardia (pulse rate-100/min), blood pressure was 110/70 mm of Hg and wheezing sound present during auscultation.

**Investigations**

1. **Hemogram-** Haemoglobin 11.0 gm%, ESR-14/first hour, Total Leucocyte Count (WBC)-13800/dl, Total Erythrocyte Count-3.8 millions/dl, Platelets counts - 3.50lakhs/dl (14 October 2019).
2. **Sputum Smear Examination-**Acid Fast Bacilli (AFB) -negative (not found) sputum sample date on 12, 14 and 15 October 2019 report negative.

3. **Microbiology Study** – Aerobic bacteria by organism identified Escherichia coli
4. **Radiological investigations:** X-ray of chest of PA view- it revealed airspace and interstitial opacities on upper lobe of left lung.

## MATERIALS AND METHODS

**Place of study –** National institute of Ayurveda OPD no.3 **Name of patient**- xxxx, **Reg no.**-11211102019, **Date of first visit**- 11/10/2019, **Age**-24 year **& Gender**-Male

**Treatment protocol:** Patient was given the following treatment (mentioned in table no.1) continued for 15 days and patient had some relief in shortness of breathing, cough and weakness.

**Ingredients of medicines given to the patient**
**Table-no-2** *Sitophaladichurn*[8]
**Table no-3** *Amastha awaleha* cough syrup[9]
**Table no-4** Mincof [10]- Mincof is cough syrup manufactured by Shree Dhootapapeshwar Ltd. Its ingredients are.
**Table no-5** *Daraksharisthaistha*[11]

**Discussion: -**

- ***Sitophaladichurn*** – *SitopaladiChurna* is an effective ayurvedic medicine that comprises of *Sita* (sugar),*Vasalouchan*,*Ela* (Cardamom), *Dalchini* (Cinnamomum), *Pippali* (*PiperLongum*) and other ingredientswith *Madu* and *Sarpi*.*AacharyaCharak* described in the Rajayashmathat *SitopaladiChurna* is best for upper respiratory congestion and bronchial conditions.*SitopaladiChurna* has a bacteriostatic effect on this bacterium. It offers a supportive role in relieving symptoms in the initial stages of the infection. *SitopaladiChurna*, when used in combination with other act as anti-tubercular medicines, can relieve symptoms of tuberculosis such as fatigue, appetite loss, night sweats etc. This helps the body to eliminate toxins that cause fever. Symptoms of fever such as tiredness, loss of appetite and physical debility can be sorted with the intake of this *Churna*.[12]
- ***AbharkBharsma* (*Mica*):-**The *Maharasas* of the *Rasashastras* are covered. *Shatputa* and *SahastraputaAbhrak* are particular aspects of *Abharak Bhasma* that have historically been utilised to treat *Yakshma* (TB), *Prameha* (Diabetes), *Pandu*, *Raktapitta*, *Jwar*, *ShwasakasaVikara* (Respiratory illnesses), *Hrudroga* and other ailments.[13]
- ***Vidanga*(*Embelia ribs*) :-** In *Ayurvedic* literature, *Vidanga* has been considered as one of the most effective *Krimighna Dravyas*. Antibacterial activities of the drug work against the bacterial pathogens.[14]
- ***Pippali (Piper longum)*** is a *Kasahar Daravyaand Meda &Kapha Vinashini, Shwas, Kasa, Jwarhar, Visrya, Madehya, Agnivardhani.*[15]
- ***Malla-Sindoor*** is an Ayurvedic mineral compound that includes *Malla* stands for arsenic trioxide (As2O3), *Parad* stands for mercury (Hg), and *Gandhak* stands for sulphur (S). Arsenic is a powerful toxin, and it is only used in Ayurvedic medicine after a thorough cleansing and purifying procedure. For the preparation of *Kupipakwarasayan*, preparation of *Kajjali,* time duration, and heating pattern are the most important factors to obtain maximum yield and increase the efficacy of the product without any untoward effect. *MallaSindoor* has *Ushna*, *Tikshna*, *Kapha*-Amasanshodhana qualities and is a powerful stimulant for the lungs, heart, and nerves. This stimulating activity may aid in the delivery of more oxygenated blood to the lungs. *Malla and Raskarpur, two of Malla- Sindoor's* constituents, have purgative qualities. As a result, it reduces *Malabaddhata* (constipation), which is a common side effect of asthma medication.
- As a result, it reduces *Malabaddhata* (constipation), which is a common side effect of asthma medication. It possesses antibacterial and antiviral properties since it is an Arseno-mercurial preparation. As a result, it may be beneficial in infection-related disorders. *MallaSindoor* is beneficial in the treatment of *Vata and Kapha* disorders. It is effective in the treatment of *Vata* disorders, *Pakshaghata*, *Amavata*, gout, and *Kapha* ailments, as well as Pneumonia and Respiratory illnesses. *Mallasindoor* is also used to treat hysteria, old age weakness, chronic asthma, indigestion, male sex organ weakness, influenza, *Vishamjwar, and Prameha*. Hysteria, Weakness in Old Age, Chronic Asthma, Indigestion, Weakness of Male Sexual Organ, Influenza, *Vishamjwar, and Prameha* are some of the conditions.[16]
- ***Sphatika Bhasma*** (*ShubhraBhasma*):-Alum is used to make S*phatika Bhasma* (Fitkari). It's used to treat blood disorders, respiratory illnesses, and skin conditions. It's used to treat pneumonia, chronic cough, bronchitis, tuberculosis vomiting, hematemesis (blood in the vomit), menorrhagia, metrorrhagia, and menometrorrhagia, chronic diarrhoea, and abdominal pain from lead

poisoning. It can also help with skin issues including herpes, leucoderma, and vitiligo when applied externally.[17]

- **Mincof-** As mentioned in its literature it helps in relieving productive cough, dry cough, tonsillitis, sore throat, whooping cough, smoker`s cough, allergic condition.
- ***Amastha awaleha*** According to literature mentioned by the patent Ayurvedic pharmaceutical company MPhilin these medicines it acts as an effective bronchodilator. Prevents formation of allergens and IgE complexes, stimulates endogenous cortisone production, relieves irritation and bronchial spasm and improves body's defence mechanism. It acts as an effective expectorant. Reduces the intensity of cough and has mucolytic effect. Use as prophylactic in bronchial asthma, chronic bronchitis, and cough with or without bronch- spasm, naso-bronchial allergy.
- ***Daraksharistha*** according to *Sidhayogasamagarh* beneficial in *Kasa, Shwas, Rajayshama, Nirbakta, Nidransaha, Manshik Bharm, Shiroshula, Bala Virya Vridhikar* Etc.It provides the relief from the shortness of breath and wheezing sound by reducing the aggravated inflammation in the respiratory tract. *Draksharishta* can prevent the frequent asthma attacks naturally.
- The patient after taking the above mentioned treatment are relieved from shortness of breath, cough, fever after taking treatment for seven days and get relieved from breathing difficulty while walking after the treatment for fifteen days. As per Ayurveda the *lakshanas* mentioned in *Swashnak Jwara* are directly correlated with pneumonia. The drugs and the treatment protocol used by us in the above patient helped the patient to get relief from above symptoms. The most of the drugs used were *Swas-kas nashak and balaya* also which directly helped the patient. *Pipalli* and *draksharisht* used were *balaya and rasayan* and so act as a rejuvenation of the infected cells of the body. *Vidang as krimighan* act as a anti-microbial and was very beneficial for the patient. The patient is completely recovered from his symptoms from above treatment.

## CONCLUSION

E. coli pneumonia is a rare case. The description of such pneumonia as such not found in Ayurveda but the symptoms of *swasnak jwar* as described in Ayurveda having more similarly with the aforesaid disease. That's why the prescription as advised in *swasanak Jwar* is also given to the patients and improvements are seen and the patients get totally symptoms less after follow up visits. That's why we can say to treat the pneumonia originated due to e. coli can be cured with the Ayurveda medicines with definite formulation with the supervision of an Ayurveda physicians. To make it more authentication a large-scale patients should be treated with the same.

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Doi:- https://doi.org/10.47223/IRJAY.2021.41208

**Table 1 no. Treatment protocol: -**

| MEDICINE | DOSE | TIMING | ADJUVANT |
|---|---|---|---|
| 1.*SitopaladiChurna*<br>*Abrkabhasam*(*Shashtaraputi*)<br>*Chohast Pahari Pipali*<br>*Subhra Bhsama*<br>*Malaa Sindur*<br>*Vidnaga Churna* | 5gm<br>100mg<br>1gm<br>500mg<br>250mg<br>3gm | Two time before meal | Honey |
| 2 *Amastha* | 1 tsf | Two time | |
| 3 *SyrupMincof* | 15 ml | Two time | With equal amount of water |
| 4 *Darasharisha* | 20 ml | Two time | With equal amount of water |

**Table-no-2 Shows no. *Sitophaladichurn*[8]**

| | | | |
|---|---|---|---|
| 1 | *Sita (mishri)* | Sugar candy powder | 16 parts |
| 2 | *Vamsalochan* | *Saccharumofficinarum* | 8 parts |
| 3 | *Pipali* | *Piper Longum* | 4 parts |
| 4 | *Ela* | *Elettaria Cardamomum* | 2 parts |
| 5 | *Dalchini* | *Cinnamomum Zeylanicum* | 1 Parts |

**Table no-3 Shows no. *Amastha awaleha* cough syrup[9]**

| S. No. | Ayurvedic Name | Botanical Name | Quantity |
|---|---|---|---|
| 1 | *Vasa* | *Adathoda Vasica* | 400 mg. |
| 2 | *Kantkari* | *Solanum Xanthocarpum* | 400mg. |
| 3 | *Yasthimadhu* | *Glycyrihiza glabra* | 400mg. |
| 4 | *Dashmool* | *Dashmool* | 200mg. |
| 5 | *Bharango* | *Clerodendron Serrtum* | 200mg. |
| 6 | *Pushkarmool* | *Inlua racemosa* | 100mg. |
| 7 | *Kachur* | *Curuma Zedoria* | 200mg. |
| 8 | *Bahera* | *Termenalia belerica* | 100mg. |
| 9 | *Haldi* | *Curuma longa* | 100mg. |
| 10 | *Khajur* | *Phoenix doctyldefera* | 400mg. |
| 11 | *Bhumi* | *Phyanthus niuri* | 100mg. |
| 12 | *Chitrak* | *Plubago Zeylanica* | 100mg. |
| 13 | *Gazban* | *Onosma Bracteatum* | 100mg. |
| 14 | *Giloy* | *Tinospora cordifollia* | 100mg. |
| 15 | *Lisoda* | *Cordia dichotoma* | 100mg. |
| 16 | *Tulsi* | *Ocimum Sanctum* | 200mg. |
| 17 | *Babool* | *Acacia Arabica* | 100mg. |

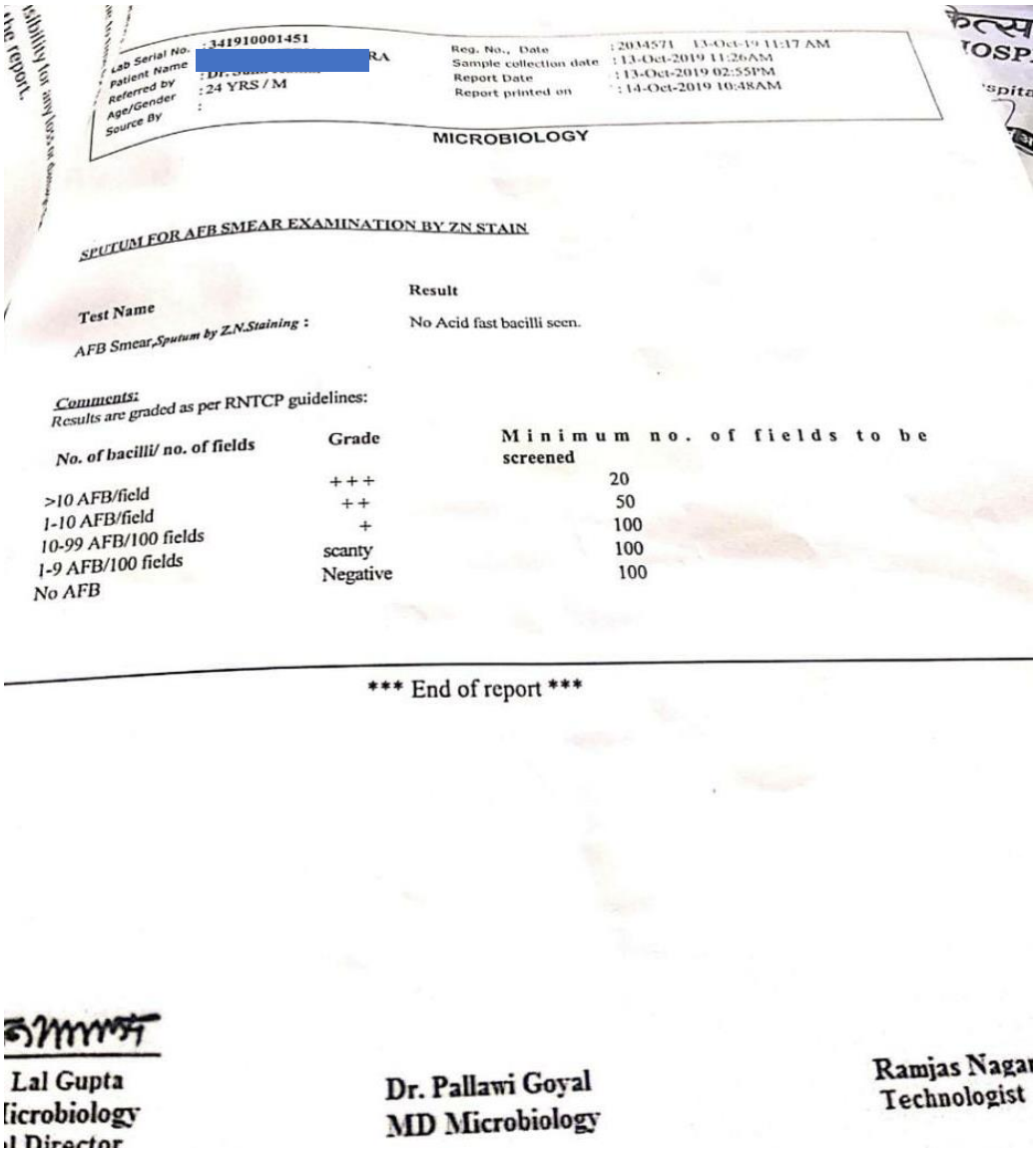
| ***Prakshep Dravya*** | | | |
|---|---|---|---|
| 1. | *Kakrasingi* | *Pistacia chinensis* | 100mg. |
| 2. | *Saunthi* | *Zingiber officinale* | 100mg. |
| 3. | *Marich* | *Piper Nigrum* | 100mg. |
| 4. | *Pippali* | *Piper Longum* | 100mg. |
| 5. | *Rudanti* | *Cressa cretica* | 25mg. |
| 6. | *Dalchini* | *Cinnamonne Zeylanicum* | 25mg. |
| 7. | *Long* | *Syzyglum Aromaticum* | 25mg. |
| 8. | *ELA* | *Elettaria cardamomum* | 25mg. |
| 9. | *Tejpatra* | *Cinnamomum tamaka* | 25mg. |
| 10. | *Keshar* | *Crocus sativus* | 0.2mg. |
| 11. | *Amalk* | *Emblica officnalas* | 1.70g. |
| 12. | *Phuh* | *Sugar* | 6.6g. |
| 13. | *Satks* | *Sodium benzoate* | 20mg. |
| 14. | *Till oil* | *Seasamum oil* | 100mg. |

**Table no-4. Mincof [10]- Mincof is cough syrup manufactured by Shree Dhootapapeshwar Ltd. Its ingredients are.**

| | | | |
|---|---|---|---|
| 1 | *Vasa* | *Adathoda Vasica* | Leaf 330mg |
| 2 | *Banaohsha* | *Viola Odorata* | Flower 110mg |
| 3 | *Yastimadhu* | *Glycyrrhiza Glabra* | Stem and root 99mg |
| 4 | *Kantkari* | *Solanum Xanthocarpum* | Whole plant 88mg |
| 5 | *Bibhitaka* | *Terminelia Belerica* | Fruit pericarp 77mg |
| 6 | *Pipali* | *Piper Longum* | Fruit 44 mg |
| 7 | *Haridra* | *Curcuma Longa* | Rhizome 55mg |
| 8 | *Sunthi* | *Zinzgiber Offcinale* | Rhizome 33mg |
| 9 | *Tulasi* | *Ocimum Sanctum* | Whole plant 66 mg |
| 10 | *Bharangi* | *Clerodendrum Serratum* | Root 22 mg |
| 11 | *Narasara* | | 22 mg |

**Table no 5.Shows no. *Draksharisthaistha*[11]**

| S.N | **Ingredients** | **Quantity** |
|---|---|---|
| 1. | *Draksha* | 2400 Ms |
| 2. | *Water* | 24,456 Grams |
| 3. | *Jaggery* | 9600 Grams |
| 4. | *Cardamom* | 48 Grams |
| 5. | *Cinnamon* | 48 Grams |
| 6. | *Indian Bay Leaf* | 48 Grams |
| 7. | *Nagkesar* | 48 Grams |
| 8. | *Priyangu* | 48 Grams |
| 9. | *Black Pepper* | 48 Grams |
| 10. | *Long Pepper* | 48 Grams |
| 11. | *Vaividang* | 48 Grams |
| 12. | *Dhataki Flowers* | 48 Grams |



Lab Serial No. : 341910001451
Patient Name : [redacted]RA
Referred by : Dr. [redacted]
Age/Gender : 24 YRS / M
Source By :

Reg. No., Date : 2014571 13-Oct-19 11:17 AM
Sample collection date : 13-Oct-2019 11:26AM
Report Date : 13-Oct-2019 02:55PM
Report printed on : 14-Oct-2019 10:48AM

**MICROBIOLOGY**

***SPUTUM FOR AFB SMEAR EXAMINATION BY ZN STAIN***

| Test Name | Result |
|---|---|
| *AFB Smear,Sputum by Z.N.Staining* : | No Acid fast bacilli seen. |

*Comments:*
*Results are graded as per RNTCP guidelines:*

| *No. of bacilli/ no. of fields* | Grade | Minimum no. of fields to be screened |
|---|---|---|
| >10 AFB/field | +++ | 20 |
| 1-10 AFB/field | ++ | 50 |
| 10-99 AFB/100 fields | + | 100 |
| 1-9 AFB/100 fields | scanty | 100 |
| No AFB | Negative | 100 |

*** End of report ***

Lal Gupta
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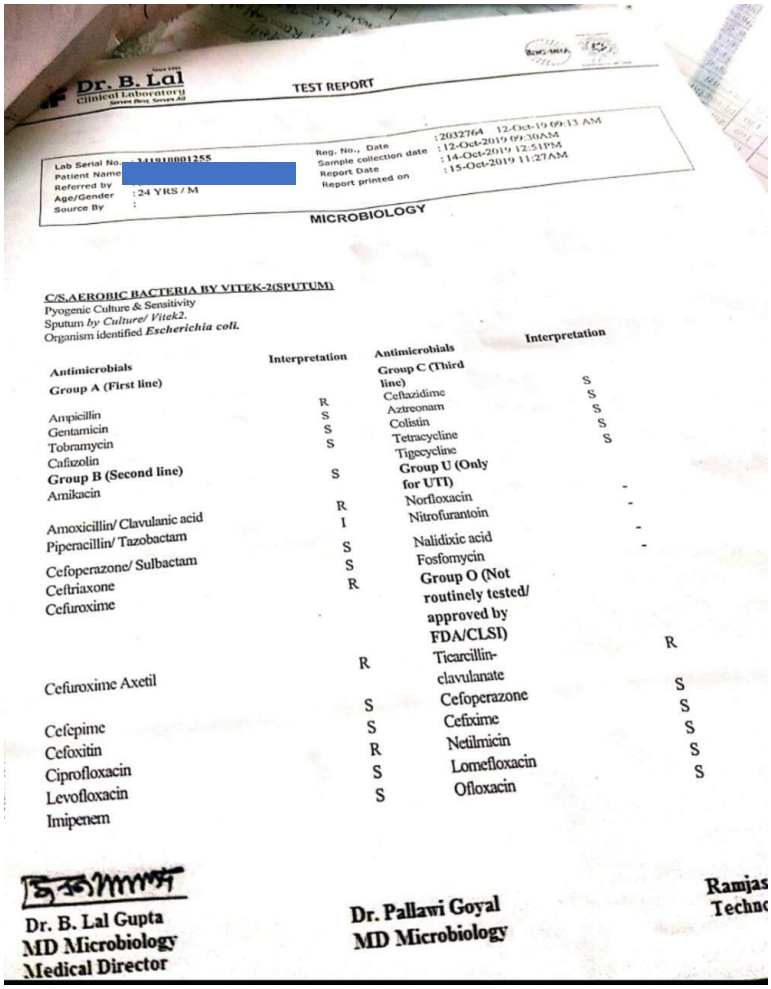
Ramjas Nagar
Technologist



Dr. B. Lal
Clinical Laboratory

TEST REPORT

Lab Serial No.: 3419100001255
Patient Name: [redacted]
Referred by:
Age/Gender: 24 YRS / M
Source By:

Reg. No., Date: 2032764 12-Oct-19 09:13 AM
Sample collection date: 12-Oct-2019 09:30AM
Report Date: 14-Oct-2019 12:51PM
Report printed on: 15-Oct-2019 11:27AM

MICROBIOLOGY

C/S.AEROBIC BACTERIA BY VITEK-2(SPUTUM)
Pyogenic Culture & Sensitivity
Sputum *by Culture/ Vitek2.*
Organism identified ***Escherichia coli.***

| Antimicrobials | Interpretation | Antimicrobials | Interpretation |
|---|---|---|---|
| **Group A (First line)** | | **Group C (Third line)** | |
| Ampicillin | R | Ceftazidime | S |
| Gentamicin | S | Aztreonam | S |
| Tobramycin | S | Colistin | S |
| Cafazolin | | Tetracycline | S |
| **Group B (Second line)** | | Tigecycline | |
| Amikacin | S | **Group U (Only for UTI)** | |
| Amoxicillin/ Clavulanic acid | R | Norfloxacin | - |
| Piperacillin/ Tazobactam | I | Nitrofurantoin | - |
| Cefoperazone/ Sulbactam | S | Nalidixic acid | - |
| Ceftriaxone | S | Fosfomycin | - |
| Cefuroxime | R | **Group O (Not routinely tested/ approved by FDA/CLSI)** | |
| Cefuroxime Axetil | R | Ticarcillin-clavulanate | R |
| Cefepime | S | Cefoperazone | S |
| Cefoxitin | S | Cefixime | S |
| Ciprofloxacin | R | Netilmicin | S |
| Levofloxacin | S | Lomefloxacin | S |
| Imipenem | S | Ofloxacin | S |

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