

Isolation of secondary bacterial infections in pulmonary tuberculosis patients

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Abstract

This study was aimed to isolation the secondary bacterial infection from pulmonary tuberculosis patients from the new case and failure of tuberculosis treatment .The antimicrobial susceptibility to the isolated secondary bacterial infection in pulmonary tuberculosis in the new and failed treated cases were done.

From the 50 collected sputum specimens, the results show the percentage of positive secondary bacterial infection is 72%(n. 36), and negative is 28% (n.14), also the study showed that 27 from the 36 cases had a positive secondary bacterial infection were from new cases 75%, while only 9 of 36 cases had a positive secondary bacterial infection were from failure of tuberculosis treatment 25%.The secondary bacterial infection in pulmonary tuberculosis were found in 21 male patients(58.3%) and 15 in female patients(40.7%).In this study there was an isolation four types of secondary bacterial infection in those 36 pateints such as: 20 patients with *Streptococcus pneumoniae* (55.6%), 8 with *Streptococcus pyogens* (22.2%), 4 with *Staphylococcus aureus* (11.1%), and 4 with *Klebsiela pneumoniae* (11.1%).

The results showed there was a high percentage of resistant to some antibiotics.

Introduction

Tuberculosis remains the most important infectious disease in the world despite the efforts made in the past decade to bring the problem under control(1). This dire situation led the World Health Organization (W.H.O.) in 1993 to declare tuberculosis infection as world wide health emergency (2), and recommended direct observed course treatment (DOTS) strategy to achieve the goal to detect 70% of new smear positive pulmonary tuberculosis (3) and cure 85% of them by 2005. In Iraq tuberculosis is considered as one of the top priority in health program plans(4,5).

DOTS strategy were adopted to cover all the country that is the tuberculosis patients provide and observe them swallowing anti-tuberculosis drugs in the primary health care centers freely(6,7). It is a matter of great pleasure that Iraqi anti-tuberculosis and chest disease society in corporation with national tuberculosis program and funded by W.H.O. regional office publish this document on the management of tuberculosis in Iraq (8,9). The study aimed the isolation and identification of the secondary bacterial infection in pulmonary tuberculosis patients from new cases and failure of tuberculosis treatment.

Materials &Methods

The samples were collection in cup must be plastic, transparent disposable and always clean and not broken. Wide mouth, closely cover, can written on it by wax pencil. There is another glass container (universal bottle) can be used (10).

Procedure of sputum collection:

1. The samples must be collected in a special room with high ventilation system.
2. The patients should be informed that the sample is not from the saliva, but from the deep respiratory system, and the patient should washes his mouth well to remove the food residues.
3. The sample volume is between (2-5 ml.), and it should contain purulent and mucous, and not saliva only.
4. The external surface of the container must be clean. The patient washes his hands with water and soap after collecting the sample .

Suitable samples for the test:

The sputum must be mucoid, liquid and contains air bubbles and purulent particles and occasionally bloody thread, brown color, so the sample must be classified according to the appearance into:

1. Mucoïd: contains mucus.
2. Purulent: contains pus cells.
3. Muco-purulent: contains mucus.
4. Bloody.

Preparation of the smear:

1. Labeling the slides according to the number of the sample.
2. Use new slide after cleaning with alcohol and dry.
3. The label written by diamond pencil.
4. Don't mix the sputum before choosing the purulent material.
5. Smear the sputum on the middle third of the slide.
6. The smear must not be very thick (homogenous).
7. Dry the slide and fix by flame.

Sputum examination:

Sputum is the a material coughed up from lungs, bronchi, trachea, and larynx consists of mucous secreted by respiratory mucosa, products of tissue disintegration due to disease exudates from lesions and materials from nearby structures that might have established communication with respiratory tract (11).

Procedure of examination:**Stain smears:**

1. Select suspicious portion of sputum.

2. Make a smear on a clean glass slide.
3. Fix the smear by passing slide slowly through the flame 3-4 times. Stain the smear by Ziehl-neel method (sputum for AFB). It shows the presence of *Mycobacterium tuberculosis*(12)

Results and Discussion

Table 1: Distribution of pulmonary tuberculosis patients according to secondary bacterial infection

Type	No.	%
Secondary infection positive in new cases	36	72%
Secondary infection negative in failed treated cases	14	28%
Total	50	100%

Table- 1 shows that 72 % of the tuberculosis patients had secondary infection positive, while the percentage of secondary infection negative is only (28%) due to misuse of antibiotics, immunosuppression, malnutrition, diabetes, and old age (13, 14)

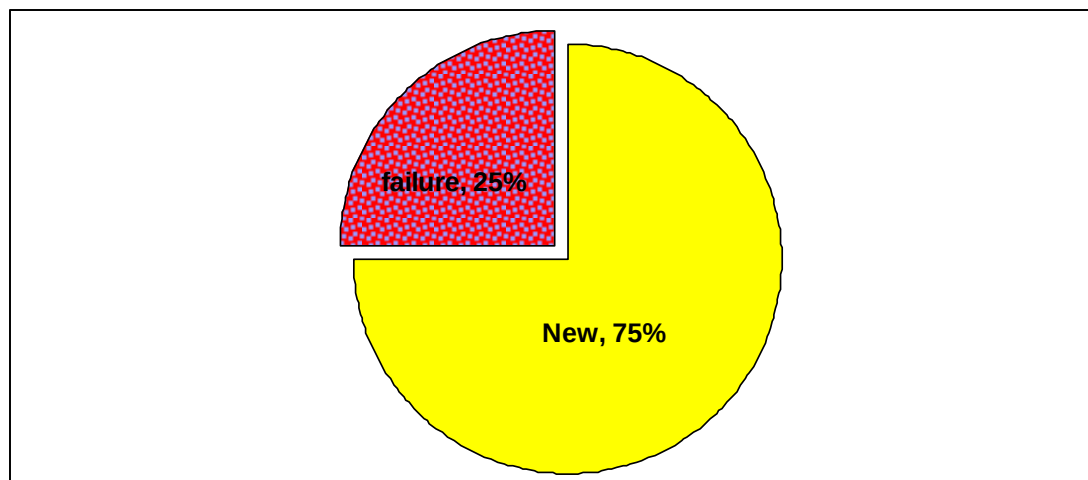


Figure 1 Distribution of secondary bacterial infection according to new case and treatment failure.

Figure -1 revealed percentage of secondary bacterial infection within new tuberculosis patient group (n. 27 75%) is more than in failure tuberculosis patient group (n.9 25%), new infections occurred at a rate of about one per second (15). Infection is associated with a period of immunosuppression precipitated by malnutrition, alcoholism, diabetes, and old age (16).

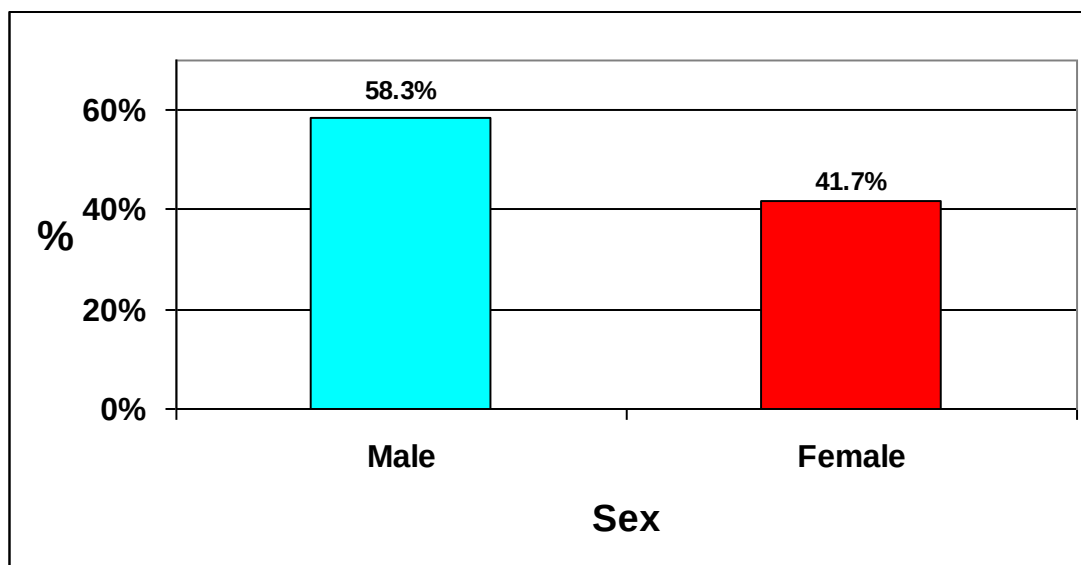


Fig. 2 : Distribution of secondary bacterial infection according to gender.

The higher percentage of secondary bacterial infection in the male more than female,(Fig. 2)this may be due to the male work in various fields, may be due to non sanitary, and crowded area especially in cases of poorly area, thus the male more exposure to infection (17).

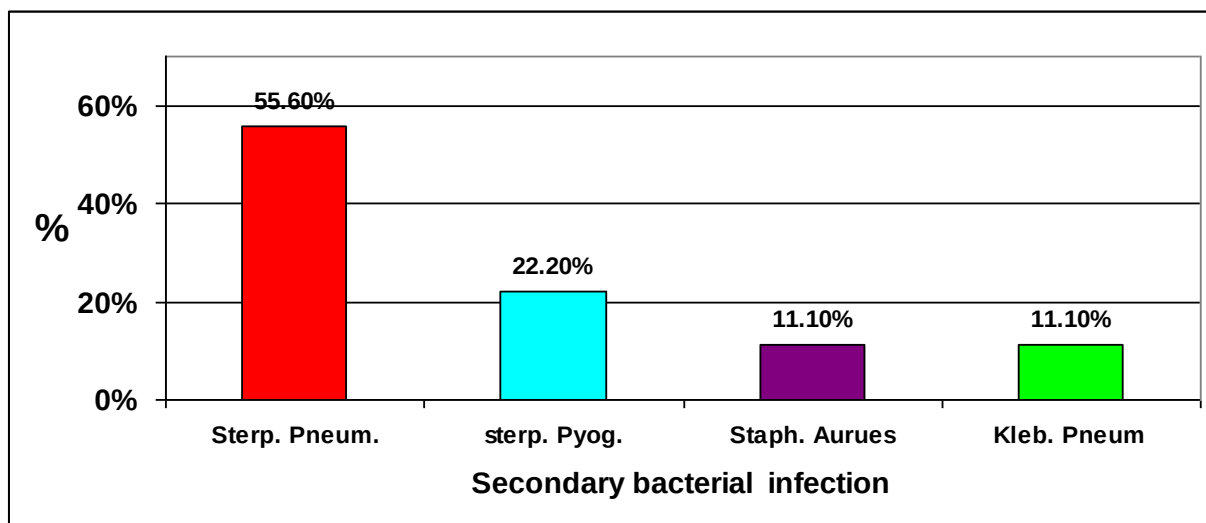


Fig. 3 Descriptive secondary bacterial infection groups surveyed in this study.

According to Fig.3 the majority percentage of secondary bacterial infection is *Strep Pneumonia* (55.6%), while the *Sterp pyogene* (22.2%). On the other hand the percentage of *Staph aureus* and *Kleb. Pneumoniae* secondary bacterial infection are equal (11.1%).

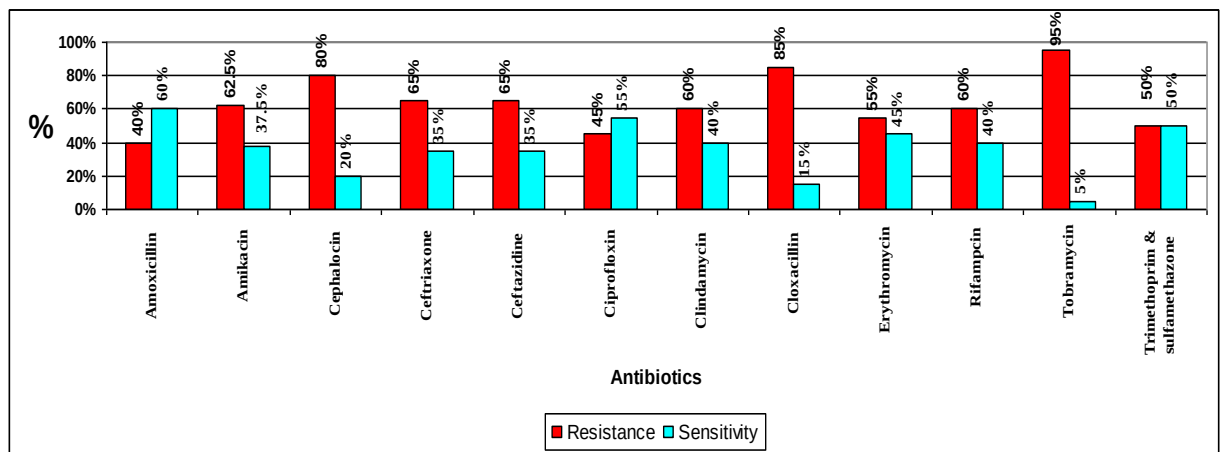


Fig. 4 Susceptibility test for *Strep Pneumonia*

Fig. 4 showed the susceptibility test for *Strep Pneumonia*, the amoxicillin is the lowest percentage of resistance (40%), while the tobramycin is the highest percentage of resistance (95%) (19).

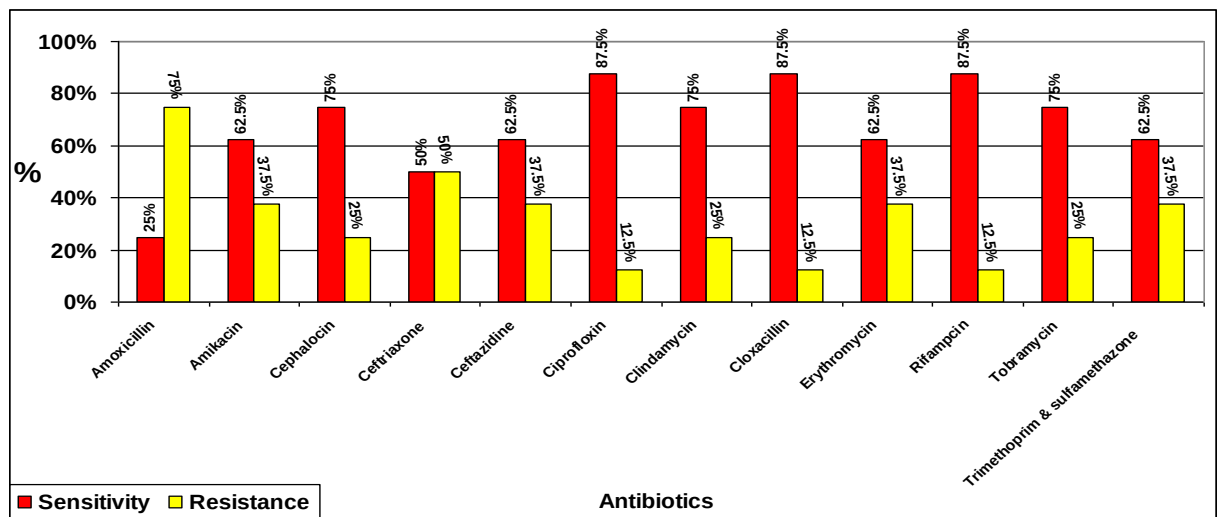


Fig. 5 Susceptibility test for *Strep pyogene*

Fig. 5 refer to amoxicillin is the lowest percentage resistance (25%) and the highest percentage of resistance (87.5%) in rifampicin, cloxacillin and ciprofloxacin (20)

Conclusions

- 1.Secondary bacteria infection in male is more than in female.
- 2.The most dominant secondary bacterial infection are *streptococcus pneumoniae*,*streptococcus pyogene* ,*Staphylococcus aureus*,*klebsiella pneumonia*.
- 3.We see in the antimicrobial susceptibility testing to the isolation secondary bacteria infection in pulmonary tuberculosis patients found high percentage of resistance to antibiotics.

Recommendations

- 1.It is recommendation to conduct coherent study recruiting a large number of pulmonary tuberculosis patients to validate the results of the current.
- 2.Using culture test to pulmonary tuberculosis patients to isolate secondary bacterial infection .
3. Using new technique to isolate secondary bacterial infection like PCR.

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الخلاصة

هدفت الدراسة الى عزل الإصابات البكتيرية الثانوية من الحالات الجديدة وحالات الفشل بالعلاج التي ترافق الاشخاص المصابين بالتدرن الرئوي. وعمل فحص الحساسية للحالات التي يظهر لديهم اصابات ثانوية مستخدمين مجموعة من المضادات ومن بينها التي تستخدم في معالجة التدرن الرئوي. اظهرت الدراسة ان نسبة 72% لديهم اصابات ثانوية (العدد 36) و 28% (العدد 14) لم يظهر لديهم اصابات من مجموع 50 عينة تم فحصها. كذلك اظهرت الدراسة ان نسبة 75% من الحالات الجديدة كانت لديهم اصابات ثانوية بينما كانت نسبة الفشل بالعلاج للذين ظهر لديهم اصابات ثانوية 25%. كانت نسبة الذكور للاصابات الثانوية 58.3% (العدد 21) والاناث 40.7% (العدد 15). كذلك تبين من خلال الدراسة ظهور اربعة انواع من البكتريا *Streptococcus pyogens* (22.2%) (العدد 8)، *Streptococcus pneumonia* (55.6%) (العدد 20)، *Staphylococcus aureus* و *Klebsiela pneumonia* (11.1%)

اظهرت نتائج فحص الحساسية لبعض المضادات ان نسبة البكتريا المقاومة للعلاج عالية جدا.

