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Research Article

RESISTANCE AND SENSITIVITY OF KLEBSIELLA PNEUMONIA STRAINS TO DIFFERENT ANTIBIOTICS IN SAMPLES FROM ALMOUJTAHD HOSPITAL

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ABSTRACT

Objective: This study aimed to determine Klebsiella pneumonia antibiotic resistance to different antibiotics. **Materials and methods:** This is a retrospective study at AlMoujtahd Hospital (Damascus Hospital) between 1/6/2017 and 31/12/2017 including all samples of Klebsiella pneumonia infections during the studied period. **Results:** We found 63 samples with Klebsiella pneumonia Infection. The most resistance was against Cefaclor (94.4%), while the highest sensitivity against Klebsiella pneumonia was by Imipenem (72.5%). **Conclusion:** Resistance of the Klebsiella pneumonia in our study to different antibiotics was much higher than the resistance percentages of similar studies and that shows the obvious misuse, overuse and lack of knowledge about their effects among general population.

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INTRODUCTION

Antibiotics has changed medicine and saved millions of lives for decades now. However, bacterial resistance is becoming a major problem by causing adverse effects on morbidity and mortality rates. (1-6). The antibiotic resistance crisis has been related to the lack of awareness about these medications, the misuse and overuse of them. (2-5) According to the Centers for Disease Control and Prevention in the U.S, some of the bacteria due to its very high resistance are becoming an urgent and serious concern. Moreover, this issue could be causing a burden clinically and financially on the healthcare systems worldwide. (1,5,7,8).

MATERIALS AND METHODS

This study was a retrospective study of all the cultures of Klebsiella pneumonia infection of patients who reviewed AlMoujtahd Hospital (Damascus Hospital) and were hospitalized and diagnosed with Klebsiella pneumonia infection between 1/6/2017 to 31/12/2017. This study included 63 cases. Only the authors to ensure the privacy collected all the data and all the names and personal information were blinded. Statistical analysis was done using SPSS 25.0.

RESULTS

Table 1 Gender Distribution of Our Study

Gender	N	%
Female	29	47.6
Male	33	52.4
Total	63	100.0

Table 2 Source of samples in our study

Source of sample	N	%
urine	23	36.5
sputum	9	14.3
wipe	17	27
bronchial secretions	1	1.6
Pus	11	17.5
Abscess	1	1.6
Catheter	1	1.6
Total	63	100.0

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Table 3 Frequency of cases that are (Resistant, Sensitive, and Intermediate) to different antibiotic therapies

Pathogen / antibiotic combinations	No. of isolates reported	All Isolates			Chi-Square value	P-value	
			N	%			95% CI
CRX	34	Resistant	28	82.4	[0.69 , 0.95]	37.471	0.000*
		Intermediate	1	2.9	[0 , 0.08]		
		Sensitive	5	14.7	[0.028 , 0.266]		
CAZ	59	Resistant	44	74.6	[0.64 , 0.86]	45.186	0.000*
		Intermediate	8	13.6	[0 , 0.23]		
		Sensitive	7	11.9	[0.04 , 0.2]		
CZ	49	Resistant	41	83.7	[0.74 , 0.94]	56.98	0.000*
		Intermediate	1	2.0	[0 , 0.09]		
		Sensitive	7	14.3	[0.04 , 0.24]		
GN	57	Resistant	42	73.7	[0.63 , 0.85]	42.421	0.000*
		Intermediate	5	8.8	[0.02 , 0.16]		
		Sensitive	10	17.5	[0.08 , 0.28]		
NOR	40	Resistant	15	62.5	[0.48 , 0.78]	10.75	0.005*
		Intermediate	2	8.3	[0 , 0.17]		
		Sensitive	7	29.2	[0.15 , 0.43]		
LEV	53	Resistant	26	49.1	[0.36 , 0.62]	10.679	0.005*
		Intermediate	7	13.2	[0.04 , 0.22]		
		Sensitive	20	37.7	[0.25 , 0.51]		
MER	40	Resistant	25	62.5	[0.48 , 0.78]	21.65	0.000*
		Intermediate	1	2.5	[0 , 0.08]		
		Sensitive	14	35.0	[0.20 , 0.45]		
AK	60	Resistant	29	48.3	[0.35 , 0.61]	8.1	0.017*
		Intermediate	11	18.3	[0.08 , 0.28]		
		Sensitive	20	33.3	[0.21 , 0.45]		
IPM	40	Resistant	4	10.0	[0.01 , 0.19]	27.95	0.000*
		Intermediate	7	17.5	[0.16 , 0.30]		
		Sensitive	29	72.5	[0.59 , 0.87]		
AUG	38	Resistant	30	78.9	[0.66 , 0.92]	37	0.000*
		Intermediate	1	2.6	[0 , 0.08]		
		Sensitive	7	18.4	[0.06 , 0.30]		
CFR	40	Resistant	32	80.0	[0.68 , 0.2]	14.4	0.000*
		Intermediate	8	20.0	[0.08 , 0.32]		
		Sensitive	0	0	[0 , 0]		
CTX	43	Resistant	37	86.0	[0.76 , 0.96]	22.349	0.000*
		Intermediate	6	14.0	[0.04 , 0.24]		
		Sensitive	0	0	[0 , 0]		
CCL	54	Resistant	51	94.4	[0.88 , 1]	42.667	0.000*
		Intermediate	3	5.6	[0 , 0.12]		
		Sensitive	0	0	[0 , 0]		
CPR	57	Resistant	38	66.7	[0.55 , 0.79]	32.947	0.000*
		Intermediate	3	5.3	[0 , 0.11]		
		Sensitive	16	28.1	[0 , 0]		
CTR	51	Resistant	43	84.3	[0.74 , 0.94]	60.706	0.000*
		Intermediate	1	2.0	[0 , 0.08]		
		Sensitive	7	13.7	[0.04 , 0.22]		

*CRX: Cefuroxime, CAZ: Ceftazidime, CZ: cefazoline, GN: gentamycin
 NOR: norfloxacin, MER: meropenem, AK: amikacin
 AUG: Augmentin, CTX: Cefotaxime, CCL: Cefaclor
 CPR: Cefprozil, CTR: Ceftriaxone, CFR: Cefadroxil, IPM: Imipenem, LEV: Levofloxacin.

DISCUSSION

This study was done to determine the resistance of *Klebsiella pneumonia* to commonly used antibiotics. Our study included 63 cases of *Klebsiella pneumonia* infection with a predominance of males 33 cases (52.4%) and 30 females (47.6%). Most of the cases were urine samples 23 cases (36.5%), which was the most common. 17 cases were collected using wipes from wounds, 11 cases from pus samples, 9 cases from sputum samples and 1 case of each of the following: catheter, bronchial secretions and abscess samples.

A similar study (9) showed that *Klebsiella pneumonia* resistance to Cephalosporins was (11.3%), which was the highest, while the resistance to Carbapenems was (3.3%). In our study, *Klebsiella pneumonia* was resistant to most Cephalosporins with a statistical significant (p<0.05).

94.4%, 86%, 84.3%, 83.7%, 82.4%, 80%, 74.6% and 66.7% of *Klebsiella pneumonia* cases were resistant to *(CCL, CTX, CTR, CZ, CRX, CFR, CAZ and CPR), respectively.

Klebsiella pneumonia resistance to Fluoroquinolones (norfloxacin, Levofloxacin) was 62.5%, 49.1%, respectively. Furthermore, 73.7% and 48.3% of *Enterobacter* cases had resistance against gentamycin and amikacin, respectively (Both Aminoglycosides). Regarding Carbapenems (meropenem specifically) 62.5% of *Enterobacter* strains was resistant to it. Resistance to Augmentin was high with 78.9%.

Only one medication in our study (Imipenem) had a more prevalent sensitivity against *Klebsiella pneumonia* with a statistical significance (p<0.05) in which 72.5% of *Klebsiella pneumonia* cases were sensitive to it.

It should be noted that the resistance of the Klebsiella pneumonia in our study to different antibiotics was much higher than the resistance percentages of similar studies (9) and that shows the obvious misuse, overuse and lack of knowledge about their effects among general population.

*CRX: Cefuroxime, CAZ: Ceftazidime, CZ: cefazoline, CTX: Cefotaxime, CCL: Cefaclor, CPR: Cefprozil, CTR: Ceftriaxone, CFR: Cefadroxil.

CONCLUSION

We found 63 samples with Klebsiella pneumonia Infection. The most resistance was against Cefaclor (94.4%), while the highest sensitivity against Klebsiella pneumonia was by Imipenem (72.5%). To conclude, resistance of the Klebsiella pneumonia in our study to different antibiotics was much higher than the resistance percentages of similar studies and that shows the obvious misuse, overuse and lack of knowledge about their effects among general population.

Compliance with Ethical Standards

Funding: This study was not funded by any institution. Conflict of Interest: The authors of this study have no conflict of interests regarding the publication of this article.

Ethical approval: The names and personal details of the participants were blinded to ensure privacy.

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