

سورة الفاتحة

قال تعالى:

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ
الْحَمْدُ لِلَّهِ رَبِّ الْعَالَمِينَ الرَّحْمَنِ الرَّحِيمِ
مَالِكِ يَوْمِ الدِّينِ إِنَّا نَعْبُدُكَ
وَنَسْتَغِيثُ إِنَّكَ الصِّرَاطُ الْمُسْتَقِيمُ
صِرَاطُ الَّذِينَ أَنْعَمْتَ عَلَيْهِمْ
غَيْرِ الْمَغْضُوبِ عَلَيْهِمْ وَلَا الضَّالِّينَ

صدق الله العظيم

Declaration

I hereby declare that this work is original research work; undertaken under supervision of prof/Dr. Humodi A. Saeed and has not been presented elsewhere for the award of a degree or a certificate. All sources have been cited and appropriately acknowledged.

Nnme : Ali Fadhil Kadhum

Signature: Date : 18/03/2012

Dedication

I dedicate this work:

To my father and mother mercy of Allah, brothers and sisters.

To whom I exceptionally love my wife Dr. Aliaa Fouad Baqir.

To my daughter Noor and my son Yaseen.

To my relative, friends and colleagues.

Acknowledgment

First of all thanks to Almighty Allah who gives me the power to complete this study. With a great deal of respect I would like to express my thanks to my supervisor Prof. Humodi Ahmed Saeed for his advice and patience. This work would not be done without his non-stop guidance. Thanks are extended to my co-supervisor Dr. Mogahid M. EL-Hassan. I am very grateful to the staff of the Microbiology Laboratory of Rashid hospital in UAE for their support. Thanks and appreciation to Miss. Suheir Ramadan and to all staff of the Research Laboratory in Sudan University of Science and Technology for their utmost support.

Abstract

The presence of extended spectrum β -lactamase (ESBL)- producing bacteria significantly affects the infection management worldwide. The objective of this study was to detect and characterize ESBL-producing enterobacteria in Khartoum hospitals.

A total of 350 clinical specimens were collected from different hospitals in Khartoum State. The specimens cultivated on selective agar media. Identification was done by Gram's stain and API 20E. The presence of ESBLs was determined by double disk synergy test, combination test and E-test. The genotypic characterization of ESBLs was done by polymerase chain reaction technique.

The results revealed that 125 enterobacterial species were identified. The identified bacteria include *Escherichia coli* 47 (37.6%), *Klebsiella pneumoniae* 27 (21.6%), *Proteus mirabilis* 10 (8%), *Enterobacter cloacae* 2 (1.6%), *Pantoea spp.* 15(12.0%), *Klyvera spp.* 5 (4.0%), *Serratia odorifera* 3 (2.4%), *Serratia marcescens* 2 (11.6%), *Proteus vulgaris* 2 (1.6%), *Citrobacter spp.* 4 (3.2%), *Klebsiella ozania* 1 (0.8%), *Klebsiella oxytoca* 1 (0.8%), *Enterobacter sakazakii* 5 (4.0%), *Proteus peneri* 1 (0.8%). 50(40%) species were found ESBLs-producers by double disk synergy test. 36(28.8%) of the isolates gave ESBLs positive by combination test and E-test. 40 genes (CTX-M 26(65%), TEM 8(20%) and SHV 6(15%) were detected. 3 (*Proteus mirabilis*, *Enterobacter sakazaki* and *E. coli*) out of 36 isolates gave ESBLs positive when tested by multiplex PCR technique. Among three species only 4 genes were detected. These genes were CTX-M(2) and TEM (2).

It is concluded that the most prevalent enterobacterial species is *E. coli* followed by *Klebsiella pneumoniae*. The two genera were ESBL- producers. The CTX-M gene was the most common, followed by TEM and SHV. Further studies about ESBLs-producing bacteria in community setting are highly recommended.

المستخلص

وجود البكتيريا المنتجة لانزيمات البيتا لاكتام الممتدة الطيف تؤثر تأثيراً واضحاً في ادارة العدوى في جميع أنحاء العالم . الهدف من هذه الدراسة لكشف و تمييز البكتيرية المعوية المنتجة لانزيم البيتا لاكتام ممتدة الطيف في مستشفيات الخرطوم.

جمعت 350 عينة سريرية من مختلف مستشفيات ولاية الخرطوم . أستزرعت هذه العينات على اوساط الأجار الانتخابية تم التعرف على البكتيرية المعوية بواسطة صبغة الجرام والإختبارات الكيموحيوية. تم تحديد وجود إنزيمات البيتا لاكتام ممتدة الطيف بواسطة إختبار مزدوج التآزر؛ وفحص القرص المزدوج وفحص الاختبار الـ E. تم التوصيف الوراثي لانزيمات البيتا لاكتام ممتدة الطيف بواسطة تقنية تفاعل البلمرة المتسلسل.

أظهرت النتائج التعرف على 125 نوع بكتيري معوي. شملت البكتيريا التي تم التعرف عليها (37%) 47 الأسكريشية القولونية و (21.6%) 27 الكليبيسيلا الرئوية و (8%) 10 المتقلبة الشائعة و (1.6%) 2 الأمعائية المذرفية و (12%) 15 انواع البونية و (4%) 5 انواع الكلافيرة و (2.3%) 3 السراتية اودوريفيرا و (1.6%) 2 السراتية الذابلة و (1.6%) 2 المتقلبة الاعتيادية و (3.2%) 4 الليمونية و (0.8%) 1 الكليبيسيلاوزونية و (1.6%) 1 الكليبيسيلاأكسوتوكية و (4%) 5 الأمعائيةساكازاكي و (0.8%) 1 المتقلبة بنيري. أظهرت (40%) 50 نوع بكتيري وجود انزيمات البيتا لاكتام ممتدة الطيف بواسطة إختبار مزدوج التآزر. (28.8%) 36 من الأنواع البكتيرية اعطت نتيجة موجبة لأنزيمات البيتا لاكتام ممتدة الطيف بواسطة إختبار القرص المزدوج وفحص اختبار الـ E. تم الكشف عن 40 جين CTX-M26/40 (65%) و TEM8/40 (20%) و SHV15/40 (15%) 3. (المتقلبة الشائعة, الأمعائيةساكازاكي, الأشريشية القولونية) من 36 عينة معزولة اعطت نتيجة موجبة لأنزيمات البيتا لاكتام ممتدة الطيف بواسطة اختبار تفاعل البلمرة المتسلسل المتعدد. كانت النتيجة CTX-M 2 , 2 TEM.

خلصت الدراسة الى ان اكثر انواع البكتيرية المعوية شيوعاً هي الأشريشية القولونية تليها الكليبيسيلا الرئوية. وهما جنسان منتجاً لأنزيمات البيتا لاكتام ممتدة الطيف. وكان جين CTX-M الأكثر شيوعاً يليه TEM ثم SHV. ويوصى بشدة إجراء الدراسات الواسعة حول البكتيرية المنتجة لأنزيمات البيتا لاكتام ممتدة الطيف.

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