

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ ﴿١﴾
الْحَمْدُ لِلَّهِ رَبِّ الْعَالَمِينَ ﴿٢﴾
الرَّحْمٰنِ الرَّحِيمِ ﴿٣﴾ مَلِكِ يَوْمِ الدِّينِ ﴿٤﴾
إِيَّاكَ نَعْبُدُ وَإِيَّاكَ نَسْتَعِينُ ﴿٥﴾ أَهْدِنَا
الصِّرَاطَ الْمُسْتَقِيمَ ﴿٦﴾ صِرَاطَ الَّذِينَ أَنْعَمْتَ
عَلَيْهِمْ غَيْرِ الْمَغْضُوبِ عَلَيْهِمْ
وَلَا الضَّالِّينَ ﴿٧﴾

Declaration

I hereby declare that this work is original research work; undertaken under supervision of Prof. **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.

Name:**Abdulmoniem Elhaj Siddiq Ali**

Signature:

Date:

DEDICATION

To my parents, supervisor, family and friends.

With respect and love

ACKNOWLEDGEMENT

Prayers to **my GOD** who gave me the power and health to overcome all the difficulties that faced me, through my life.

Sincere thanks and appreciation were due to my supervisor **Prof. HumodiA. Saeed** for his supervision and unlimited support during this work. Thanks to all **friends** and **colleagues**.

Finally, all love and thanks to my sweet family, **wife** and **children**.

ABSTRACT

Detection of extended spectrum β -lactamases (ESBLs) is a major challenge for the clinical microbiology laboratory due to the variable affinity of these enzymes for different substrates and inoculum effect. The present study was designed to detect the ESBLs in *Pseudomonas aeruginosa* isolates from hospitalized patients and to evaluate their susceptibility pattern to antibiotics.

In this study, 350 specimens were collected including wound swabs, eye swabs, nasal swabs, ear swabs, urine and sputum from hospitalized patients in Khartoum State hospitals. The specimens were cultured on appropriate culture media. The isolates were identified by their colonial morphology, Gram's stain and biochemical identification tests using the API 20E identification system. The presence of ESBL enzymes were detected by phenotypic technique using double disc synergy and combined disc methods. TEM, SHV, and CTX-M genes were detected by polymerase chain reaction technique.

The results revealed that 65 clinical isolates of *Ps. aeruginosa* were recovered. Only 3 (4.6%) of the isolates were ESBL positive when examined by double disc synergy test and combination disc test. Detection of ESBL genes by PCR showed that only the gene CTX-M was present.

It is concluded that *Ps. aeruginosa* in general has ability to produce ESBLs as well as members of Enterobacteriaceae, but in limited cases. Further studies utilizing multiplex PCR for the detection TEM, SHV and CTX-M genes in ESBL producing *Ps. aeruginosa* are highly recommended.

المستخلص

الكشف عن إنزيمات البيتالاكتام الممتدة الطيف يشكل تحدياً كبيراً لمختبر الأحياء الدقيقة السريرية وذلك لتقارب المتغيرات لهذه الإنزيمات وتأثيرها على الركائز واللقاحات المختلفة.

صممت هذه الدراسة للكشف عن إنزيمات البيتا لاكتام الممتدة الطيف في الزائفة الزنجارية في بعض مستشفيات ولاية الخرطوم وتقييم مختلف أنماط حساسيتها للمضادات الحيوية.

جمعت 350 عينة من مرضى في مستشفيات الخرطوم. شملت العينات مسحات الجروح، والعين، والأنف والأذن والبول والقشع. أسترعت العينات في اوساط غذائية مناسبة. وتم التعرف على البكتيريا المعزولة بدراسة الشكل الظاهري للمستعمرات وصبغة جرام والإختبارات الكيموحيوية. ومن ثم أستخدمت للكشف عن انزيمات الطيف الممتد للبيتالاكتامات. وتشمل هذه الاختبارات فحص المضادات الحيوية والتوصيف الجزيئي. وقد تم الكشف عن ذلك باستخدام تفاعل البلمرة وهي CTX-M و SHV، ITEM المتسلسل الوراثي و هي تقنية للكشف عن وجود.. الانزيمات المسؤولة عن إنتاج الطيف الممتد للبيتالاكتامات

أظهرت النتائج عزل 65 نوع من انواع الزائفات وأن ثلاثة منها منتجة لإنزيمات البيتا لاكتام الممتدة الطيف. أظهرت الدراسة بغرض الكشف عن الجينات المسؤولة عن فقط CTX-M هذه الجينات باستخدام تقنية تفاعل البلمرة المتسلسل وجود الجين

خلصت الدراسة إلى أن الزائفة الزنجارية منتجة لإنزيمات البيتا لاكتام الممتدة الطيف كما هو الحال عند عائلة الإمعائيات وأن دراسات إضافية مطلوبة بشدة

باستخدام تقنية تفاعل البلمرة CTX-M و SHV و TEM للكشف عن الجينات المتسلسل المتعدد.

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