



ISSN Print: 2664-6188
 ISSN Online: 2664-6196
 Impact Factor: RJIF 5.35
 IJCBB 2023; 5(2): 26-30
www.biochemistryjournal.net
 Received: 19-06-2023
 Accepted: 27-07-2023

Aseel Ali Albadery
 Department of Biology, College
 of Science, University of
 Basrah, Iraq

**Amani Abd-Al-Ridha Al-
 Abdullah**
 Department of Pathological
 Analyses, College of Science,
 University of Basrah, Iraq

Saad Shakir Mahdi Al-Amara
 Department of Pathological
 Analyses, University of
 Basrah, Iraq

Investigation of β -lactamase-producing *Escherichia coli* from cancer patients

Aseel Ali Albadery, Amani Abd-Al-Ridha Al-Abdullah and Saad Shakir Mahdi Al-Amara

DOI: <https://doi.org/10.33545/26646188.2023.v5.i2a.46>

Abstract

Background: *E. coli* is nosocomial bacteria which leading infections of the urinary tract in the patients with cancer. The emergence of β -lactam-resistant strains is a major source of concern in UTI treatment. resistant to β -lactam *E. coli* is becoming more of an issue everywhere, including in Iraq. The study estimate β -lactam-resistant *E. coli* prevalence in Basrah province/ Iraq.

Methods: The isolated uropathogens were detected by Vitek®2 technique, and the *E. coli* sensitivity to antibiotics was assessed. Additionally, *E. coli* were examined using the DAM and DDST techniques, and polymerase chain reaction (PCR) was used to find the main β -Lactamase genes blaTEM, blaOXA, blaCTX-M, and blaSHV.

Results: The urine samples were collected from patients with cancer (120) from Basrah center of the Oncology Al-Sader Teaching Hospital, who were suspected with UTIs. Biochemical tests used to identify bacterial growth have revealed a variety of bacterial species, with *E. coli* isolates accounting for the majority of cases (53.6%) and the other types (19.34%), respectively. The findings of this investigation revealed that among (n=22) *E. coli* isolates, the 12 (54.55%) of the isolates produced extended spectrum-lactamases (ESBLs) with positive results. While employing the double-disc approximation method, the results for the 10 (45.45%) isolates showed no evidence of ESBL production. Polymerase chain reaction and double-disc synergy were used to detect the *TEM*, *CTX-M*, *SHV*, and *OXA* genes encoding ESBL. The percentage of genes found in the isolates under study were (100%), (31.8%), (100%), and (100%), respectively

Conclusions: There is a spread of multiple types of ESBLs *E. coli* from UTIs cancer patients in Basra hospitals, and the isolated *E. coli* have a high ability to produce ESBLs against the third generation of cephalosporins and monobactam antibiotics.

Keywords: ESBLs, *E. coli*, UTIs, cancer

Introduction

Immunodeficiency in cancer patients is a common problem, and it puts them at a higher risk of contracting various infections due to the treatment or the itself cure [1, 2, 3]. The urinary tract infection is associated with the cancer [4]. UTS are commonly caused by bacteria, which arise when there are more than 100,000 colony-forming units in 1 mL of urine, but they can also be caused by viruses and fungi, such as candida. All the types of the bacteria can cause infection, which is followed by clinical signs [5-6].

UTI is caused common by Enterobacteriaceae, with uropathogenic *Escherichia coli* (UPEC) at 80-90% of all infections [7, 8]. Followed by *K. pneumonia*, *Staph. spp.*, *Candida spp.*, *E. faecalis*, *Streptococcus*, *Proteus mirabilis*, and *P. aeruginosa*, respectively [9]. UPEC vary from commensal strains in that they have gained virulence and resistance determinants through plasmids, bacteriophages, pathogenicity islands, or transposons' DNA horizontal transfer, allowing them to colonize the urinary tract effectively and cause a wide range of diseases [7]. One of the most serious dangers of the twenty-first century is third-generation resistant Enterobacteriaceae, which includes Enterobacteriaceae that produce ESBLs. According to WHO [10]. The presence of genes that produce β -lactamase enzymes in Gram-negative bacteria is mechanisms of antibiotic resistance [11]. Extended-spectrum β -lactamases (ESBLs) hydrolyze many β -lactam antibiotics, causing failure in the bacterial infections treatment [12-13].

Corresponding Author:
Aseel Ali Albadery
 Department of Biology, College
 of Science, University of
 Basrah, Iraq