

A. Adler¹, T. Miller-Roll¹, M.V. Assous², Y. Gefen³, S. Paikin⁴, D. Schwartz⁵, Y. Wiener-Well⁶, K. Hussein⁷, R. Cohen⁸, Y. Carmeli¹

¹Epidemiology, Tel-Aviv Sourasky Medical Center, Tel-Aviv, Israel ; ²Microbiology, Sha'are Zedek Medical Center, Jerusalem, Israel ; ³Microbiology, Rambam Medical Center, Haifa, Israel ; ⁴Microbiology, Laniado Hospital, Netanya, Israel ; ⁵Microbiology, Tel-Aviv Sourasky Medical Center, Tel-Aviv, Israel ; ⁶Infectious Disease, Sha'are Zedek Medical Center, Jerusalem, Israel ; ⁷Infectious Disease, Rambam Medical Center, Haifa, Israel ; ⁸Infectious Disease, Laniado Hospital, Netanya, Israel

Objectives: Little is known about the molecular epidemiology of KPC-producing *E. coli* (KPEC). We aimed to describe the clonal structure and resistance mechanisms of KPEC in a multicenter study.

Methods: This was a retrospective study of all patient-unique KPEC isolates collected from January 2009 until June 2012 from both surveillance and clinical cultures. The study was conducted in four medical centers in Israel: Tel-Aviv Medical Center (TASMC), Laniado Hospital (LH), Sha'are-Zedek Medical Center (SZMC) and Rambam Medical Center (RMC). Antimicrobial susceptibility testing was performed by agar dilution for carbapenem agents and by the VITEK-2 system for other antimicrobial agents. The clonal structure was studied by PFGE and MLST. The *bla*_{KPC} allele and the *bla*_{ESBL} genes were studied by PCR and sequencing.

Results: The study included 88 KPEC isolates, 38 from SZMC, 21 from RMC, 17 from TASMC and 12 from LH. Twelve KPEC were from clinical sites and the rest from surveillance cultures. The STs, *bla*_{KPC} allele and the *bla*_{ESBL} genes of the main sequence types (ST) (>2 isolates) are presented in the table. The clonal structure was highly diverse, with 79 and 45 different PFGE types and STs, respectively. The most common clones were ST-131 and ST-410 identified in 21 isolates (23%). *bla*_{KPC-2} and *bla*_{KPC-3} were identified in 68 and 20 isolates, respectively. *bla*_{ESBL} genes were found in 28 isolates, most commonly *bla*_{CTX-M-15} and *bla*_{CTX-M-27}. All isolates were non-susceptible to ertapenem; 16 (18%) and 35 (40%) isolates were susceptible (MIC≤1 mg/L) to imipenem and meropenem, respectively. Isolates were susceptible to colistin, amikacin, ciprofloxacin, gentamicin and trimethoprim-sulfamethoxazole in 100, 87, 28, 27 and 21% of the cases, respectively.

Conclusion: The clonal structure of KPEC in Israel is characterized by the predominance of known international ESBL-producing clones and by high intra- and inter-institutional diversity. This suggests that clonal spread does not play a major role in the dissemination of KPEC.

ST	Center(s)	Isolates, no. (%)	PFGE types, no.	<i>bla</i> _{KPC} allele (no.)	<i>bla</i> _{ESBL} gene (no.)
ST410	RMC	4	4	KPC-3 (4)	CTX-M-15 (2), none (2)
	SZMC	3	2	KPC-3 (3)	CTX-M-14 (1), CTX-M-15 (1), none (1)
	TASMC	5	3	KPC-2 (5)	CTX-M-15 (4), none (1)
ST131	RMC	3	3*	KPC-3 (2), KPC-3 (1)	CTX-M-15 (2), none (1)
	SZMC	3	2*	KPC-3 (2), KPC-3 (1)	none (3)
	TASMC	3	2	KPC-3 (3)	CTX-M-15 (1), CTX-M-27 (2)
ST69	SZMC	9 (10.2)	4	KPC-3 (3), KPC-3 (1)	none (4)
	TASMC	1	Non-typeable	KPC-2 (1)	none (1)
ST10	RMC	1	1	KPC-3 (1)	none (1)
	SZMC	2	2	KPC-3 (2)	none (2)
	TASMC	1	1	KPC-2 (1)	none (1)
ST3329	LMC	2	1*	KPC-3 (2)	CTX-M-15 (2)
	SZMC	2	2*	KPC-2 (1), KPC-3 (1)	CTX-M-15 (2)
ST167	RMC	1	1	KPC-3 (1)	none (1)
	SZMC	1	1	KPC-3 (1)	none (1)
	TASMC	1	1	KPC-3 (1)	none (1)
ST48	LMC	3 (3.4)	2	KPC-3 (2)	none (2)
	RMC	1	1	KPC-2 (1)	none (1)
ST1431	LMC	3 (3.4)	1	KPC-3 (2)	CTX-M-14 (1)
	TASMC	1	1	KPC-3 (1)	none (1)
ST2451	RMC	2 (2.3)	1*	KPC-3 (1)	CTX-M-15 (1)
	SZMC	1	1*	KPC-3 (1)	CTX-M-27 (1)
ST34	LMC	2 (2.3)	1	KPC-3 (1)	none (1)
	SZMC	1	1	KPC-2 (1)	none (1)
ST354	RMC	2 (2.3)	1	KPC-3 (1)	none (1)
	TASMC	1	1	KPC-2 (1)	none (1)
ST405	RMC	2 (2.3)	1	KPC-3 (1)	CTX-M-9 (1)
	SZMC	1	1	KPC-2 (1)	none (1)
ST46	RMC	2 (2.3)	1	KPC-2 (2)	none (2)
ST604	TASMC	2 (2.3)	1	KPC-3 (2)	SHV-12 (2)
ST617	SZMC	2 (2.3)	1	KPC-2 (2)	CTX-M-15 (1), none (1)
ST90	RMC	2 (2.3)	1	KPC-3 (1)	none (1)
	SZMC	1	1	KPC-3 (1)	none (1)
ST93	LMC	2 (2.3)	1	KPC-2 (1)	none (1)
	SZMC	1	1	KPC-2 (1)	none (1)

* Similar PFGE-type for ST/clone between two centers.