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Long-term shedding of CTX-M-15 producing *E. coli* B2:ST127 by a healthy asymptomatic carrier

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1 **Long-term shedding of CTX-M-15 producing *E. coli* B2:ST127 by a healthy**
2 **asymptomatic carrier**

3

4 Katrin Zurfluh, Herbert Hächler, Roger Stephan, Magdalena Nüesch-Inderbinen

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6 Sir,

7 Extended-spectrum β -lactamase (ESBL) producers have become widely disseminated,
8 particularly in Asia [1]. After a four-week stay in India, a husband and wife (53 and 52 years
9 old, respectively) were concerned about possible exposure to resistant bacteria. Both were
10 healthy, without histories of hospitalization or antimicrobial therapies and had not
11 experienced gastrointestinal symptoms. Faecal swabs were taken for microbiological analysis
12 using a commercial rectal swab tube containing Amies transport medium (Copan, Brescia,
13 Italy). Culture of the husband's sample yielded ESBL producing Enterobacteriaceae (ESBL-
14 ENT) and his wife tested negative. Over the next five months the husband's faecal swabs
15 were cultured at intervals of one week, two weeks, one month, 1.5 months, 2.5 months and
16 five months, each giving rise to ESBL-ENT. A faecal sample obtained after eight months
17 tested negative, as did two follow-up samples taken at intervals of two and five weeks after
18 clearance, respectively.

19 All isolates belonged to the virulent extraintestinal *E. coli* clone B2:ST127, harboured *bla*_{CTX-}
20 *M-15*, and revealed the same PFGE pattern. One of the isolates was tested for six markers of
21 virulence associated with uropathogenic *E. coli* (UPEC) (*traT*, *fyuA*, PAI, *chuA*, *yfcv*, *vat*) and
22 eight marker genes of virulence associated with intestinal pathogenic *E. coli* (IPEC) (*aggR*
23 (EAAC), *eae* (EPEC), STh, STp and LT (ETEC), *stx1* and *stx2* (STEC) and *ipaH* (EIEC)).
24 The isolate tested positive by PCR for five of the six virulence factors that predict
25 uropathogenicity (*fyuA*, *chuA*, PAI, *yfcv*, *vat*) but none of the virulence factors for IPEC.
26 Mating experiments and PCR based plasmid replicon typing (PBRT) yielded negative results
27 for all isolates, suggesting absence of a plasmid. Southern blot hybridization provided

28 evidence for chromosomal location of *bla*_{CTX-M-15}. Full genome sequencing of the first isolate
29 (K-14KW52) revealed a chromosomally encoded *bla*_{CTX-M-15} gene embedded at the right-hand
30 extremity of an *ISEcp1* element in a plasmid-like structure [2]. All isolates exhibited
31 resistance to ampicillin, cephalotin, cefotaxime, streptomycin, kanamycin and
32 sulfamethoxazole. All except one were resistant to gentamicin.

33 CTX-M-producing isolates have become endemic during the past decade, particularly in the
34 community setting. This expansion is associated predominantly with the plasmid-mediated
35 horizontal transfer of *bla*_{CTX-M} genes [1] and with the spread of specific resistant clones, in
36 particular of *E. coli* B2:ST131. Other multidrug resistant enterobacterial lineages of clinical
37 importance include virulent extraintestinal clones belonging to phylogenetic group D such as
38 sequence types ST38 and ST405 which are associated with *bla*_{CTX-M} genes. By contrast,
39 B2:ST127 has to date not been associated with an ESBL phenotype or with multidrug
40 resistance [3]. However, it has recently been described as an emerging clone with an
41 extremely high uropathogenic potential [4] and has been associated with community-acquired
42 urinary tract infections (CAUTI) in Great Britain [3]. The detection of uropathogenic *E. coli*
43 B2:ST127 harbouring *bla*_{CTX-M-15} in a healthy person is unusual and a matter of concern, since
44 UPEC spread easily via person-to-person contact or feco-oral transmission [5]. Notably,
45 neither the carrier nor his wife developed symptoms of infection during the time under
46 observation. This report is one of few that describes chromosomal location of *bla*_{CTX-M-15} in *E.*
47 *coli*. However, further work is necessary to assess the genetic environment of this
48 chromosomal gene in *E. coli* B2:ST127 isolates.

49 Our data show that this clone can persist for at least five months in the gastrointestinal tract of
50 a healthy individual. Prolonged carriage and shedding by asymptomatic carriers as illustrated
51 by this case, may contribute to the dissemination of this clone.

52 Further studies are needed in order to assess the proportion of B2:ST127(CTX-M-15) isolates
53 causing community acquired infections such as UTI. Increased surveillance of this clone is
54 justified in order to limit future treatment failures.

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57 *Competing interests:* None declared.

58 *Ethical approval:* A written agreement of the two people in view of the sampling and
59 use of data is available.

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