

# Metallo- $\beta$ -Lactamase and Extended-Spectrum- $\beta$ -Lactamase Production by *Serratia* Strains [Letter]

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## Dear editor

In a recent study,<sup>1</sup> thirty-six *Serratia marcescens* clonally disseminated isolates harbouring a *bla*KPC-2 carrying plasmid were reported from a Zhejiang University School of Medicine hospital. We felt it appropriate to share our observations on *Serratia* strains in the last three years isolated from referred veterinary and medical clinical cases. In our laboratory, none of the *Serratia marcescens* isolates from samples referred from veterinary and medical clinical cases and, fish for meat, milk and environmental samples at Indian Veterinary Research Institute, India either produced metallo- $\beta$ -lactamase (MBL) or was resistant to any of the three carbapenems (ertapenem, meropenem and imipenem) drugs tested. However, out of 75 isolates of *Serratia* species (Table 1) identified and characterised using growth and biochemical characteristics,<sup>2,3</sup> 13 (17.3%) isolates produced MBL and 39 (52%) produced extended-spectrum- $\beta$ -lactamase (ESBL) on testing with E-strip assay using MBL and ESBL strips procured from BioMerieux, Marcy-l'Étoile, France, using the standard method prescribed by CLSI.<sup>4</sup> In our observations, none of the eight *Serratia marcescens* had imipenem or meropenem MIC  $>2 \mu\text{g mL}^{-1}$  but six of those produced ESBL. The 13 *Serratia* strains producing MBL belonged to *S. ficaria* (2), *S. liquefaciens* (1), *S. odorifera* (6) and *S. plymuthica* (4). The MIC of *Serratia* strains positive for MBL had imipenem MIC  $\geq 24 \mu\text{g mL}^{-1}$ . Six of the 13 MBL positive isolates were from buffalo milk (*S. ficaria* 2, *S. odorifera* 4) collected from different dairy farms indicating no clonal spread which was further evidenced by their different antibiograms (data not shown). The similar non-clonal spread was also suspected for rest of the 7 isolates of *Serratia* producing MBL. However, two *Serratia rubidaea* isolates from dogs having surgical wound infection getting operated in the same facility matched for their antibiogram and produced ESBL indicating nosocomial infection with the same clone.

*Serratia* strains in our study were associated with septicaemia leading to death in eight cases, abortion in cattle, wound infection and dysentery in horses (Table 1) indicating their potential to cause a variety of ailments as observed in humans.<sup>1</sup> Though *Serratia* strains rarely cause infection in animals and human beings, isolation of MBL and ESBL producing *Serratia* strains from clinical samples is not a novelty and such strains have often been reported earlier.<sup>1,5-7</sup> Detection of ESBL and MBL producing *Serratia* strains in food (fish and milk) and environmental (Neem, *Azadirachta indica*, leaves, chewed raw in the morning by many Indians to boost their health) samples pose a public health threat anytime if such potentially pathogenic strains started to propagate and spread clonally as reported in the recent study.<sup>1</sup> Looking at the profile of *Serratia*

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**Table 1** Metallo- $\beta$ -Lactamase (MBL) and Extended-Spectrum- $\beta$ -Lactamase (ESBL) Producing *Serratia* Species Strains Isolated at Clinical Epidemiology Laboratory, ICAR-Indian Veterinary Research Institute, Izatnagar, India

Serratia Species	Isolates	Source, Number of Cases	MBL+ve (Source)	ESBL +ve (Source)
<i>Serratia ficaria</i>	3	Death in duckling 1, buffalo milk 2	2 (buffalo milk 2)	1 (death of a duckling 1)
<i>Serratia fonticola</i>	2	Wound infection 1 (cattle), drinking water 1	0	1 (wound infection in cattle 1)
<i>Serratia grimesii</i>	6	Neem leaves 5, wound of elephant 1	0	4 (Neem leaves 3, wound infection in elephant 1)
<i>Serratia liquefaciens</i>	1	Wound infection in a dog 1	1 (wound infection in a dog)	0
<i>Serratia mallozivora</i>	4	Diarrhoea in spotted deer ( <i>Axis axis</i> ) 3, in black buck ( <i>Antelope cervicapra</i> ) 1	0	4 (diarrhoea in spotted deer 3, in black buck 1)
<i>Serratia marcescens</i>	8	Diarrhoea in piglet 1, multiple abscesses in a horse 1, death in birds 2, buffalo milk 1, Neem leaves 3	0	6 (Diarrhoea in piglet 1, multiple abscesses in horse 1, death in poultry birds 2, buffalo milk 1, Neem leaves 1)
<i>Serratia odorifera</i>	36	Abortion in cattle 3, buffalo milk 15, Neem leaves 2, septicaemia in spotted deer 3, cattle 1, diarrhoea in piglet 1, barking deer ( <i>Muntiacus muntjak</i> ) 1, sloth bear ( <i>Melursus ursinus</i> ) 1, wounds in cattle 1, dog 1, multiple abscesses in horses 4, UTI in dog 1, water 2	6 (Buffalo milk 4, multiple abscess in horse 1, wound infection in dog 1)	14 (Abortion in cattle 1, buffalo milk 2, Neem leaves 2, septicaemia in spotted deer 3, diarrhoea in piglet 1, sloth bear 1, multiple abscesses in horses 2, UTI in dog 1, water 1)
<i>Serratia plymuthica</i>	8	Abscess 1 in dog, wound infection in horse 1, septicaemia death in elephant ( <i>Elephas maximus indicus</i> ) 1, bloody dysentery in horse 1, fish meat 2, nasal catarrh in pig 1, UTI in a man 1	4 (Fish for meat 2, UTI in human, wound infection in dog 1)	5 (Fish meat 2, dysentery in horse 1, nasal catarrh in pig 1, septicaemia death in elephant 1)
<i>Serratia rubidaea</i>	6	Abortion in cattle 2, abscess in a man 1, surgical wound infection in dogs 2, death in pigeon 1	0	3 (Abscess in a man 1, surgical wound in dogs 2)
<i>Serratia proteamaculans</i>	1	Bat ( <i>Pteropus medius</i> ) faeces 1	0	1 (Bat faeces)

**Note:** Neem, *Azadirachta indica*.

**Abbreviations:** MBL, metallo- $\beta$ -lactamase; ESBL, extended-spectrum- $\beta$ -lactamase.

strains, it is need of the day that isolation of a *Serratia* from clinically samples should not be ignored even if it is not belonging to *S. marcescens* as in our observations only four of the 44 isolates from clinical samples belonged *S. marcescens* species and 40 were of other species.

## Disclosure

The authors report no conflicts of interest in this communication.

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