Multiresistant intestinal bacteria spread widely in Vietnamese hospitals

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Håkan Hanberger, professor at Linköping University. Credit: John Karlsson/LiU

Around half of patients admitted to hospital in Vietnam are carriers of multiresistant intestinal bacteria, which are resistant to carbapenems, a group of broad-spectrum antibiotics. This is the conclusion of a study by Swedish and Vietnamese scientists led by Linköping University, published in the *Journal of Infection*.

"In our study, we see a high prevalence of multiresistant intestinal bacteria in Vietnamese hospitals. The longer the patients are in hospital, the greater is the risk that they have been infected by intestinal bacteria resistant to carbapenems," says Håkan Hanberger, professor in the Department of Clinical and Experimental Medicine at Linköping University and consultant in the Infection Clinic at Linköping University Hospital.

There are several reasons why carbapenem-resistant enterobacteriaceae (CRE) are a serious problem. They are resistant to nearly all broad-spectrum antibiotics, which means that infections caused by these bacteria are difficult to treat. In addition, CRE can pass antibiotic-resistance genes to other bacteria, causing these to become resistant to the carbapenem group of antibiotics. Intestinal bacteria spread easily, such as on hands and furniture used in the care of infants. They cause various types of infection, primarily urinary tract infections, sepsis and pneumonia. These multiresistant intestinal bacteria are spreading rapidly around the world, and WHO has given the highest priority to measures to control the spread of CRE and to develop new antibiotics against these bacteria.

The study reported in the *Journal of Infection* included more than 2,200 patients admitted to 63 different wards at 12 hospitals in various parts of Vietnam. Rectal swabs were taken from the patients and investigated for the presence of CRE. Being a carrier is a risk factor for contracting a clinical infection with the bacteria, but not all carriers become sick.

Risk factors for becoming a carrier of multiresistant intestinal bacteria were a longer stay in the hospital and contracting an infection during the stay, known as a "hospital-acquired infection". One of eight patients (13%) were carriers at admission, which had increased to seven of eight patients (87%) after two weeks in hospital. Another risk factor for patients in the study was being treated with carbapenem, which

contributes to the carbapenem-resistant bacteria being selected.

In a sub-study of 328 new-born children in a neonatal intensive care unit, the scientists showed that mortality is linked to being a carrier for CRE and to having a hospital-acquired infection when admitted to the unit (odds ratio 5.5, p

"The sub-study looked at the most vulnerable patients, newborn children who needed intensive care, and showed that mortality was five times higher in those who had a hospital-acquired infection and were carriers of the multiresistant CRE bacteria", says Håkan Hanberger.

The researchers conclude that there is an epidemic spread of multiresistant intestinal bacteria in Vietnamese hospitals with rapid transmission to hospitalised patients.

"The extensive spread of carbapenem-resistant intestinal bacteria means that forceful measures must be taken to reduce the transmission of infection in hospitals, by improvements to hand hygiene, the use of sterile working methods during surgery and when handling venous catheters, and by isolating patients who have been affected by multiresistant intestinal bacteria. It is also important to have effective follow up when patients are discharged from hospital, in order to reduce the spread of these bacteria in the population. But even if we do everything right, it will take a long time to get infections down to an acceptably low level", says Håkan Hanberger.

In the case of Sweden, the presence of carbapenem-resistant bacteria so far is extremely low.

"Sweden is one of the countries in the world where the situation with respect to carbapenem-resistant intestinal bacteria is most favourable. It is one of the countries that can probably delay the spread the longest, but

we must improve hygiene in the healthcare services also in Sweden," says Håkan Hanberger.

More information: Dien M. Tran et al, High prevalence of colonisation with carbapenem-resistant Enterobacteriaceae among patients admitted to Vietnamese hospitals: Risk factors and burden of disease, *Journal of Infection* (2019). DOI: 10.1016/j.jinf.2019.05.013

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