



ESBL-PRODUCING BACTERIA

No. 11, 2008

Extended-spectrum beta-lactamases (ESBL) are bacterial enzymes that protect bacteria by degrading essential beta-lactam antibiotics, penicillins and cephalosporins, including cefotaxime, ceftazidime and ceftriaxone. The ESBL genes are located on plasmids which also carry genes causing resistance to aminoglycosides and fluoroquinolones. Treatment options may therefore be limited to carbapenem antibiotics. ESBL production most frequently occurs in *Escherichia coli* and *Klebsiella pneumoniae*, but has also been observed in a range of other enterobacteria and in *Acinetobacter* and *Pseudomonas* species.

Occurrence

ESBL-producing bacteria occur as part of the intestinal flora in hospitalized patients and in healthy persons in the community. The carrier state is a risk factor for subsequent infection with the same ESBL-producing bacterium.

In hospital wards, the bacteria transfer like other enterobacteria, i.e. via the faecal-oral transmission route. Infection is furthered by the presence of catheters and other foreign bodies. In the community, ESBL-producing bacteria are most frequently seen in connection with urinary infection in elderly patients and patients with underlying diseases. Below we describe an outbreak comprising a multiresistant ESBL-producing *Klebsiella pneumoniae* strain, which included several hospitals.

Outbreak with multiresistant ESBL-producing *Klebsiella pneumoniae* at Frederikssund and Hillerød hospitals

In 2007, the Clinical Microbiology Department at Hillerød Hospital recorded 107 patients with a total of 114 isolates of ESBL-producing bacteria. The isolates were distributed as 61 *Escherichia coli*, 51 *Klebsiella pneumoniae*, one *Enterobacter cloacae* and one *Klebsiella oxytoca*. The bacteria were isolated from urine (70), blood (7), rectal swabs (screening tests) (17) and various other foci (20).

In April 2007, transmission between three patients at a ward at Frederikssund Hospital was recorded. This in-

cident marked the beginning of an outbreak of gentamicin and ciprofloxacin-resistant ESBL-producing *Klebsiella pneumoniae* (EpiKpn). By June 2007, the outbreak reached the newspaper headlines as the EpiKpn strain was detected in three patients at the oncology ward of Hillerød Hospital during a single weekend. During 2007 and particularly in the summer period, a total of 33 patients infected or colonized with this outbreak strain were detected. The majority of patients had a urinary tract infection, while three had EpiKpn strain bacteraemia/sepsis. The majority of the patients had severe underlying conditions such as cancer, hepatic cirrhosis, renal failure, etc. Seven of the 33 patients were detected by rectal screening of more than 280 patients in the seven most affected wards at Frederikssund and Hillerød Hospitals.

Interventions

In the light of the experiences from a major Swedish outbreak comprising a similar strain, the EpiKpn-positive patients were placed in strict isolation, the importance of proper hand hygiene and the use of hand disinfectants was emphasized, the patients' records were marked and a note detailing their infection status was added to the discharge summaries. In the affected wards, the cleaning frequency in toilets and bathing facilities was doubled and disinfectants were used. An infection control nurse was called in to train the staff and to review procedures, and a number of toilets and bathing facilities were renovated. Following these changes, the outbreak seems to be contained as only one new patient per month has been detected during the last four months (November 2007-February 2008).

Commentary

ESBL-producing bacteria primarily pose a problem in connection with nosocomial cases, which have a strong tendency to cause outbreaks. The infections frequently entail longer admission times and consequently considerable human and financial costs. The mortality for bacteraemia caused by susceptible *Escherichia coli* and

Klebsiella strains is approx. 20%, which increases two or three fold for ESBL-producing bacteria, as detection of resistance is lengthy, and quick and relevant antibiotic treatment may therefore be delayed. If the empirical sepsis treatment consists of monotherapy with a cephalosporin – which is a trend in Denmark due to exaggerated fear of adverse reactions to aminoglycosides – mortality may be even higher. (D.S. Hansen, Clinical Microbiology Department, Hillerød Hospital, N. Frimodt-Møller, Department of Antibiotic Resistance and Hospital Hygiene)

WORLD TB DAY

The 24 March is World TB day. This year, the slogan is "I am stopping TB!". Once again, WHO encourages all national ministries of health and other organizations involved with TB control to focus on tuberculosis and the local challenges related to TB control. Even within the EU, regional differences in TB occurrence are considerable. 2005 saw in excess of 93,000 cases in the 27 EU member countries and more than 426,000 in the entire European WHO region, www.eurotb.org. WHO stresses the importance of pursuing the Berlin Declaration on Tuberculosis at national level as adopted at a ministerial forum in Berlin in October 2007, www.who.int/Document/E90833.pdf.

International TB surveillance in the WHO European region has been the joint responsibility of WHO and EuroTB from 1995 to this year. As from 2008, collection of data in the EU has been transferred to ECDC, www.ecdc.europa.eu. The ambition is that ECDC and WHO should continue to ensure that the data collection covers all of the European WHO region's 53 member states. (P. H. Andersen, Department of Epidemiology)

EASTER VACATION

Unless special circumstances arise, EPI-NEWS will not be published in week 12. The Department of Epidemiology wishes readers a happy Easter. (Department of Epidemiology)

Individually notifiable diseases

Number of notifications received in the Department of Epidemiology, SSI (2008 figures are preliminary)

Table 1	Week 10 2008	Cum. 2008 ¹⁾	Cum. 2007 ¹⁾
AIDS	2	9	8
Anthrax	0	0	0
Botulism	0	0	0
Cholera	0	0	0
Creutzfeldt-Jakob	0	3	2
Diphtheria	0	0	0
Food-borne diseases	7	54	117
of these, infected abroad	1	12	19
Gonorrhoea	8	66	79
Haemorrhagic fever	0	0	0
Hepatitis A	0	13	9
of these, infected abroad	0	5	3
Hepatitis B (acute)	0	2	5
Hepatitis B (chronic)	2	42	50
Hepatitis C (acute)	0	3	2
Hepatitis C (chronic)	15	88	68
HIV	1	35	55
Legionella pneumonia	1	21	22
of these, infected abroad	0	10	4
Leprosy	0	0	0
Leptospirosis	0	1	4
Measles	2	4	0
Meningococcal disease	1	16	10
of these, group B	1	6	5
of these, group C	0	3	4
of these, unspec. + other	0	7	1
Mumps	1	10	2
Neuroborreliosis	1	16	20
Ornithosis	0	1	1
Pertussis (children < 2 years)	0	13	18
Plague	0	0	0
Polio	0	0	0
Purulent meningitis			
Haemophilus influenzae	0	0	0
Listeria monocytogenes	1	1	5
Streptococcus pneumoniae	6	22	21
Other aethiology	0	10	3
Unknown aethiology	0	6	0
Under registration	0	7	-
Rabies	0	0	0
Rubella (congenital)	0	0	0
Rubella (during pregnancy)	0	0	0
Shigellosis	0	13	11
of these, infected abroad	0	11	5
Syphilis	3	25	21
Tetanus	0	0	0
Tuberculosis	8	76	66
Typhoid/paratyphoid fever	1	6	1
of these, infected abroad	0	4	1
Typhus exanthematicus	0	0	0
VTEC/HUS	1	21	31
of these, infected abroad	1	5	6

¹⁾ Cumulative number 2008 and in corresponding period 2007

Selected laboratory diagnosed infections

Number of specimens, isolates, and/or notifications received in SSI laboratories

Table 2	Week 10 2008	Cum. 2008 ²⁾	Cum. 2007 ²⁾
Bordetella pertussis (all ages)	4	29	32
Gonococci	17	83	68
of these, females	3	15	10
of these, males	14	68	58
Listeria monocytogenes	0	4	13
Mycoplasma pneumoniae			
Resp. specimens ³⁾	2	34	183
Serum specimens ⁴⁾	2	37	183
Streptococci ⁵⁾			
Group A streptococci	4	29	31
Group B streptococci	1	20	18
Group C streptococci	0	3	2
Group G streptococci	0	23	24
S. pneumoniae	15	275	286
Table 3	Week 8 2008	Cum. 2008 ²⁾	Cum. 2007 ²⁾
MRSA	12	85	-
Pathogenic int. bacteria ⁶⁾			
Campylobacter	38	218	369
S. Enteritidis	11	44	32
S. Typhimurium	4	48	38
Other zoon. salmonella	11	109	84
Yersinia enterocolitica	5	32	44
Verocytotoxin- producing E. coli	3	17	31
Enteropathogenic E. coli	1	14	29
Enterotoxigenic E. coli	4	48	22

²⁾ Cumulative number 2008 and in corresponding period 2007

³⁾ Resp. specimens with positive PCR

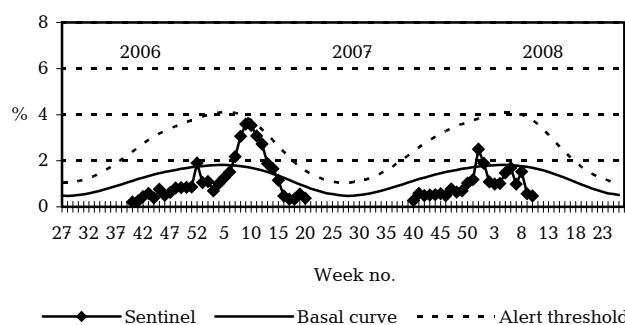
⁴⁾ Serum specimens with pos. complement fixation test

⁵⁾ Isolated in blood or spinal fluid

⁶⁾ See also www.germ.dk

Sentinel surveillance of the influenza activity

Weekly percentage of consultations, 2006/2007/2008



Sentinel: Influenza consultations
(as percentage of total consultations)

Basal curve: Expected frequency of consultations
under non-epidemic conditions

Alert threshold: Possible incipient epidemic

12 March 2008