

Antimicrobial regimens used in treatment of meningococcal meningitis in Poland

Olga Gryniewicz, Julia Kolbusz, Pawel Stefanoff

Department of Epidemiology, National Institute of Hygiene, Warsaw, Poland

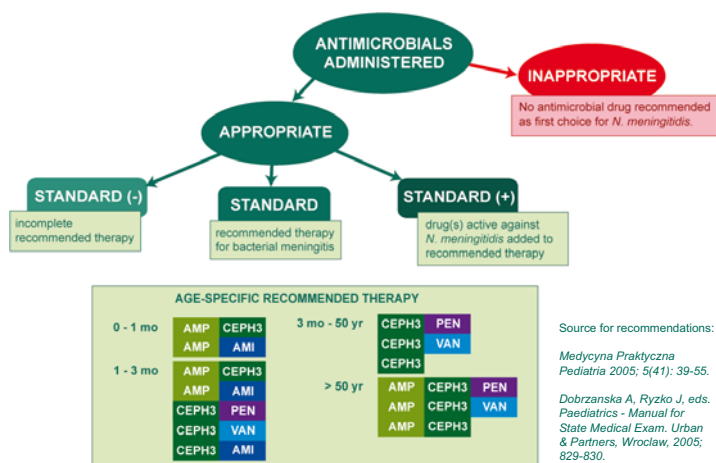
Background

- Bacterial meningitis requires immediate diagnosis and administration of treatment (empirical and selective) appropriate to age and clinical status of the patient.
- Antimicrobial regimens recommended in Poland are updated by expert groups and regularly published in scientific journals and medical manuals.
- The aim of the study was to describe antimicrobial regimens used in treatment of meningococcal meningitis in Poland and discuss their potential impact on effectiveness of therapy and antimicrobial resistance in Poland.

Material and Methods

- The analysis is based on case reports for the years 1999-2005 (n=762) from the statutory countrywide surveillance of meningococcal meningitis; Information on antibiotics used was available for 662 cases.
- Antibiotics were divided into groups and categorized into treatment regimens according to their specific activity against *Neisseria meningitidis*. (Figure 1).

Figure 1. Classification of age-specific antimicrobial regimens recommended for bacterial meningitis.



Results

- The number of antibiotics administered for 1 patient ranged from 1 to 7 (mean 2.5).
- The most common drug combinations are presented in Table 1.
- In 10 cases (1.6%) inadequate treatment was administered (cotrimoxazole, II-generation cephalosporins, metronidazole, meropenem); no association between inappropriate antimicrobial treatment and year of diagnosis, fatal outcome or laboratory confirmation was detected.
- In 124 cases there was no record of administration of drugs eradicating *N. meningitidis* from the nasopharynx.

Table 1. Number of cases receiving the most common combinations of antibiotics used in meningococcal meningitis.

Antimicrobials	Number(%)
PEN CEPH3	172 (26%)
PEN CEPH3 AMI	93 (14%)
CEPH3 AMI	81 (12%)
CEPH3	73 (11%)
PEN	47 (7%)
AMP	29 (4%)
AMP CEPH3	28 (4%)
PEN AMI	24 (4%)
AMP PEN CEPH3	18 (3%)
AMP CEPH3 AMI	16 (2%)
AMP PEN	10 (2%)

- During the studied period the proportion of cases treated with ampicillin and chloramphenicol was decreasing and the proportion of cases receiving third-generation cephalosporin and meropenem was increasing (Table 2).

Table 2. The use of antimicrobials in meningococcal meningitis in Poland during 1999-2005

Antimicrobial	Total	1999	2000	2001	2002	2003	2004	2005	p-value
III gen cephalosporin	528	86	70	56	62	51	100	103	0.0004
penicillin	405	71	54	52	53	36	71	68	0.6421
aminoglycosyde	249	53	35	21	35	29	34	42	0.1303
ampicillin	116	34	16	11	15	7	19	14	0.0021
meropenem	20	0	0	0	2	3	7	8	<0.0001
chloramphenicol	14	9	2	2	0	1	0	0	<0.0001
vancomycine	10	0	2	0	0	1	3	4	0.0304
rifampicine	7	2	3	0	0	0	1	1	0.1886
fluoroquinolones	3	1	0	0	1	0	0	1	0.9656

- Treatment exceeding recommendations was administered more often in specialistic hospitals and in infants (3-12 months of age).
- Used treatment was insufficient according to recommendations in newborns, patients over 50 years old, as well as in 47.7 % of fatal cases (Table 3).

Table 3. Number of cases receiving antimicrobial regimens according to recommended standards by age group, diagnostic certainty, and fatal outcome, Poland, 1999-2005.

	STANDARD	STANDARD (+)	STANDARD (-)
	Number of cases (%)		
Total	222 (34.0%)	252 (38.7%)	178 (27.3%)
Age group			
0-1 month	0 (0%)	2 (33.3%)	4 (66.7%)
1-3 months	11 (57.9%)	5 (26.3%)	3 (15.8%)
3 months - 50 years	216 (38.2%)	241 (42.6%)	109 (19.2%)
3-12 months	35 (29.2%)	63 (52.5%)	22 (18.3%)
12 month - 5 years	61 (39.9%)	66 (43.1%)	26 (17.0%)
5-50 years	120 (41.0%)	112 (38.2%)	61 (20.8%)
> 50 years	0 (0%)	4 (6.7%)	56 (93.3%)
Microbiological confirmation			
Yes	174 (34.5%)	198 (39.2%)	133 (26.3%)
No	48 (32.7%)	54 (36.7%)	45 (30.6%)
Petechial skin lesions			
Yes	30 (29.7%)	43 (42.6%)	28 (27.7%)
No	192 (34.8%)	209 (38.8%)	150 (27.2%)
Fatal outcome			
Yes	3 (15.8%)	7 (36.8%)	9 (47.4%)
No	219 (35.6%)	245 (38.7%)	169 (26.7%)

Conclusions

- Appropriate antimicrobial treatment in Poland is administered to 98% of meningococcal meningitis cases.
- Administration of treatment exceeding recommended standard was not prevented by microbiological confirmation and presence of pathognomonic symptoms; it may lead to increasing antimicrobial resistance of both meningococci and other bacterial strains.
- Incomplete recommended therapy in youngest and oldest age groups mostly consisting of leaving out ampicillin reflects unawareness of atypical aetiologies found in these age groups, ie. *Listeria* infections.